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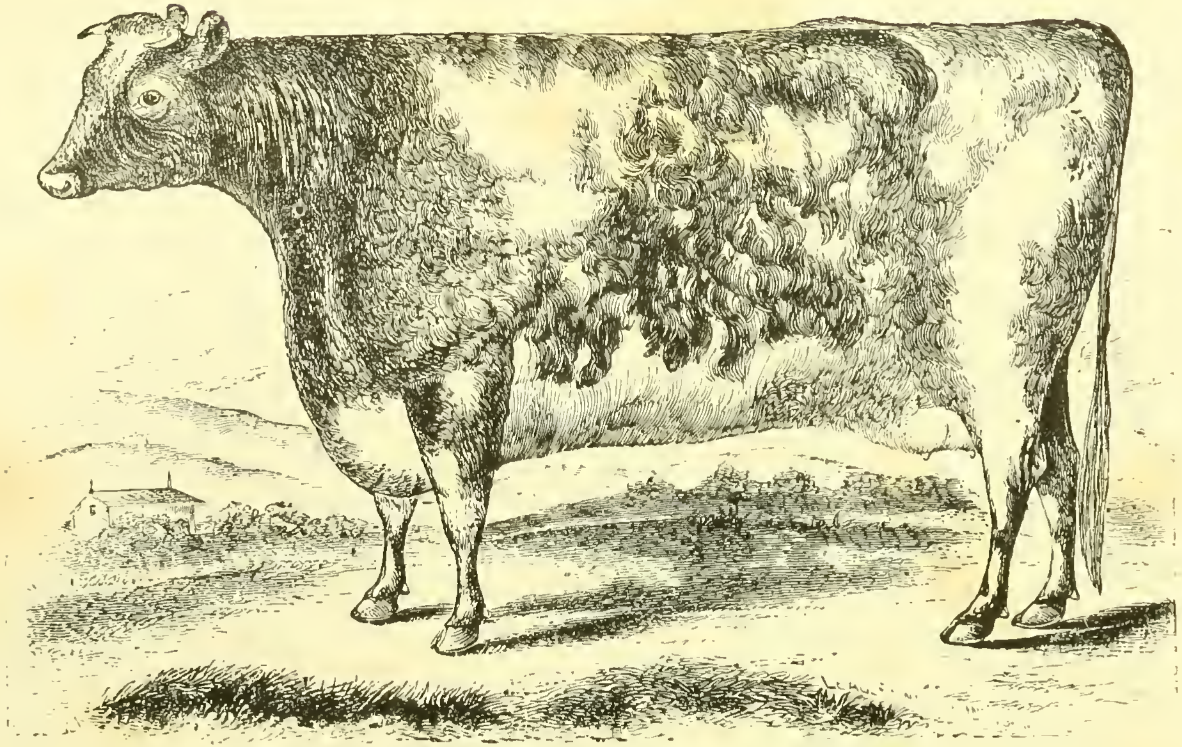

Shorthorn Cow.—"BEAUTY." Bred and owned by S. & W. S. ALLEN, Vergennes, Vt. Prize cow at the New England Show, at Springfield.

TWELFTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

Massachusetts Board of Agriculture,

TOGETHER WITH

REPORTS OF COMMITTEES

APPOINTED TO VISIT THE COUNTY SOCIETIES,

WITH AN APPENDIX

CONTAINING AN ABSTRACT OF THE

FINANCES OF THE COUNTY SOCIETIES

FOR

1864.

BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
No. 4 Spring Lane.
1865.

STATE BOARD OF AGRICULTURE.

1865.

MEMBERS EX OFFICIIS.

His Excellency JOHN A. ANDREW.
His Honor JOEL HAYDEN.
Hon. OLIVER WARNER, *Secretary of the Commonwealth.*

APPOINTED BY THE GOVERNOR AND COUNCIL.

	Term expires.
EPHRAIM W. BULL, *of Concord*,	1866
LOUIS AGASSIZ, *of Cambridge*,	1867
PAUL A. CHADBOURNE, *of Williamstown*,	1868

CHOSEN BY THE COUNTY SOCIETIES.

Massachusetts,	LEVERETT SALTONSTALL, of Newton,	1868
Essex,	GEORGE B. LORING, of Salem,	1866
Middlesex,	JOHN B. MOORE, of Concord,	1867
Middlesex North,	ASA CLEMENT, of Dracut,	1868
Middlesex South,	ELIAS GROUT, of Ashland,	1866
Worcester,	HENRY R. KEITH, of Grafton,	1866
Worcester West,	HOLLIS TIDD, of New Braintree,	1866
Worcester North,	ABEL F. ADAMS, of Fitchburg,	1866
Worcester South,	NEWTON S. HUBBARD, of Brimfield,	1868
Worcester South-East,	VELOROUS TAFT, of Upton,	1867
Hampshire, Franklin and Hampden,	THEO. G. HUNTINGTON, of Hadley,	1867
Hampshire,	LEVI STOCKBRIDGE, of North Hadley,	1868
Highland,	MATTHEW SMITH, of Middlefield,	1866
Hampden,	PHINEAS STEDMAN, of Chicopee,	1867
Hampden East,	ALURED HOMER, of Brimfield,	1867
Franklin,	JOHN M. SMITH, of Sunderland,	1868
Berkshire,	CHARLES O. PERKINS, of Becket,	1867
Hoosac Valley,	SYLVANDER JOHNSON, of Adams,	1867
Housatonic,	HARRISON GARFIELD, of Lee,	1867
Norfolk,	CHARLES C. SEWALL, of Medfield,	1868
Bristol,	SAMUEL L. CROCKER, of Taunton,	1866
Plymouth,	CHARLES G. DAVIS, of Plymouth,	1866
Barnstable,	JOHN KENRICK, of Orleans,	1868
Nantucket,	JAMES THOMPSON, of Nantucket,	1866
Martha's Vineyard,	DANIEL A. CLEAVELAND, of Tisbury,	1868

CHARLES L. FLINT, *Secretary.*

TWELFTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

BOARD OF AGRICULTURE.

To the Senate and House of Representatives of the Commonwealth of Massachusetts:

Notwithstanding the high price of labor during the past season, and an excessive drought almost unparallelled in the history of our agriculture, the year has, as a whole, been one of great prosperity for the farming interests of the Commonwealth. The war, so disastrous in many respects, having led to the disarrangement of the system of labor in the border States and throughout large sections of territory in other parts of the country, has stimulated the production of some of the crops over which those sections had, to some extent, a monopoly, and thrown whatever advantage that monopoly possessed into the hands of our own farmers. Rapid changes have taken place, therefore, in our own crops, as statistics will show, and these changes will be more apparent in the returns of the past year than in those of any year previous. The area devoted to broom corn has been much less than heretofore, and that devoted to tobacco vastly increased.

The high price of wool has had the effect to multiply the number of sheep in the State, and thus that most profitable branch of farming has been been stimulated to a greater degree than ever before. The law for the protection of sheep against dogs has been enforced with apparent good will, and though the number of sheep is still far less than it should and must of necessity be in every profitable system of farming, the enthusiasm for sheep husbandry has received such an impulse that a revolution in this respect may be said to have begun.

Nor is the change in our farming less apparent in the largely increased application of machinery and labor-saving implements to all the operations on the farm. The introduction of the larger and more expensive machines is naturally rather slow. Men require time to observe and consider them. But the last year or two has witnessed the progress in this department which, under ordinary circumstances, would hardly be expected in ten. The hay tedder, for example, has gained as strong a hold upon the attention of practical farmers in the last two years as it would in other times have gained in a much longer time, and the same may be said of other important machines. The result has been to stimulate mechanical ingenuity and to increase production with a less amount of wearing physical labor.

The manufacture and application of concentrated manures has also been largely on the increase in certain sections of the State, while greater system in making and economizing stable manures has been more widely introduced, and the buying and feeding of store cattle or sheep for the winter, mainly for the sake of their manure, which, before the war, was confined to a few, has become by no means uncommon in those portions of the State where the want of manure has been mostly seriously felt. When the price of ordinary farm-yard manure rises to ten dollars a cord and more in a district remote from market, it becomes a pretty strong incentive to effort and economy in its production.

Another evidence of increased enterprise and activity among the farming population of the State, may be seen in the largely increased numbers in attendance at the county fairs in all parts of the Commonwealth. So far as my observation has extended, these fairs were never, as a whole, so fully patronized by the public as during the past year. On one of the days of the New England Fair at Springfield no less than twenty-two thousand people were in attendance. On another day, which opened wet and lowering, eighteen thousand, and the same enthusiasm has been manifested at many of the smaller fairs.

Another significant evidence of a greater spirit of inquiry in the minds of farmers is the largely increased demand for the reports of the State Board of Agriculture. With an edition of ten thousand copies, double the number printed ten years ago, it is wholly impossible to supply the call for them, and hardly two months pass after they are ready for distribution before the number is exhausted and the distribution is obliged to be stopped. With very few exceptions, these reports now go into the hands of practical farmers, and they are unquestionably read by them to a far greater extent than formerly.

But with these and other evidences of general prosperity, enterprise and inquiry, I am sorry to be compelled to report that that fatal and dangerous disease among our horned cattle, commonly called pleuro-pneumonia, is still in existence, and requires constant watching by a competent and vigilant commission. The report of the Board of Commissioners on Contagious Diseases among Cattle, is as follows:

To the Senate and House of Representatives of the Commonwealth of Massachusetts:

In accordance with the law of 1860, relating to contagious diseases among cattle, the following Report is respectfully submitted:—

April 20th. Charles P. Preston of Danvers, and E. F. Thayer of (West) Newton, were appointed to fill the vacancies existing in the Board of Cattle Commissioners.

The Commissioners have been called to visit nineteen towns, and to examine the cattle of thirty different herds during the past eight months. In six only was the disease called pleuro-pneumonia found to exist, viz.: in one herd in the towns respectively of Lincoln, Ashby and Boxborough, in two herds in Lexington, and in the herd belonging to the city of Boston at Deer Island.

A herd of cattle belonging to John P. Reed, of Lexington, had been isolated, by order of the selectmen, and a few days before May 1st was discharged by them from further isolation. The cattle were carefully examined, and no disease was found to exist among them.

The Commissioners were also notified that there were sick cattle at the barn of Martin Beatty in Lexington. On examination, an ox (the mate had been killed by order of the selectmen,) and a cow with diseased lungs were found. Isolation of the whole herd was continued until June 16th, when, in company with the recently appointed Commissioner, F. D. Lincoln, Esq., of Brimfield, the herd was again examined. No evidence of disease was apparent, excepting in the two above mentioned, both of which were diseased to an extent that would not justify the return of the animals to the owners. Accordingly, both were slaughtered. The autopsy of the ox showed that the lower portion of the right lung adherent to the ribs, a diseased mass of lung tissue, was encysted and floating in pus. In the cow, the left lung was diseased; otherwise, the condition was similar to that of the ox.

From the history of the cases, and the pathological appearance, it was evident that the disease in both animals was of long standing, and as no other cases occurred, the remainder of the herd were released from further isolation.

On the 10th of May the Commissioners received a notice from the selectmen of Lincoln that the disease existed in the herd of George Nelson, and that the animals were kept isolated by their order.

Two cows had died, one on the 17th of March, the other on the 4th of May; several others had been sick, and were much emaciated. Generous diet was ordered and isolation continued. On the 27th, one of the cows, being greatly emaciated and evidently much diseased, was killed. A considerable mass of disease was found in the right lung; the formation of pus had commenced. The herd was kept isolated until August 3d, when three were selected as having diseased lungs, and a fourth did not thrive. It was decided to have the four slaughtered. The autopsies justified the decision in the *three;* the *fourth* was healthy.

June 3d. The Commissioners visited the farm of Levi Smith in Ashby. One of a pair of oxen purchased in Marlow, N. H., and kept in the Box Tavern stable, in Stoddard, on the night of the 24th of March was found sick, the right lung being extensively diseased. The autopsy disclosed the right lung wholly consolidated, and weighing, by estimate, at least twenty-five pounds.

Mr. Smith was confident that his herd would not take the disease, as the ox was removed soon after the sickness commenced.

On the 2d of July, nearly every animal was sick. Two were selected for experiment; the remainder were slaughtered on the 3d of August, and all but one were diseased.

July 15th. At Boxborough the Commissioners found two cows isolated by order of the selectmen, one of which showed symptoms of lung disease; the remainder of the herd had been turned to pasture, consequently were not in fit condition for examination.

On the 29th, on examination, all were found healthy, excepting the one sick at the former visit, which had died, and been buried several days. The body was exhumed, and the right lung was found to be diseased with contagious pleuro-pneumonia, so called.

Early in May, the Commissioners were requested to examine the herd of T. E. Cutter, in Lexington. Upon examination, all appeared healthy. The owner being absent at the time, no information could be elicited. In June, it being again intimated that a disease existed among his cattle, another examination took place, by appointment, July 1st. Several chronic cases were found, and it was ordered that the herd be isolated. Mr. Cutter stated that he had already lost eleven head of cattle, the first one dying in March, and there being no case of sickness for several weeks, it was hoped the remainder would escape; but on the 21st, one of the most severe cases was found; in fact the animal could not long survive. It was then decided to have the herd slaughtered. On examination, eight were diseased and five were healthy.

The Commissioners were next called to examine a herd of cattle at Deer Island, belonging to the city of Boston. Five had been killed, by the order of the directors of the institution there, before the appraisal of the herd was made. It consisted of forty-one head, many of them valuable. Eleven heavy oxen being among the number, seven were selected for experiment; thirty-four were slaughtered, seventeen proved healthy and seventeen diseased. Thirteen hundred and thirty-eight dollars and fifty-three cents ($1,338.53,) was realized from the sale of the beef, &c., of the healthy animals, and applied in part payment of the appraised value of the cattle.

The conclusions to which the Commissioners have arrived from their investigations the past year, are that if a herd of cattle is *surely* exposed by being in contact with an animal in the early stage of the disease, (as, for instance, in an ordinary barn, as cattle are usually tied up,) slaughtering the herd and selling the healthy for beef is the most *economical* mode of treating it; but if the exposure is doubtful, isolation, with careful watching, should be resorted to. Facts, with the figures to substantiate the above, can be produced, but it is thought unnecessary.

It is often asked, "Why kill the diseased? Why not let them recover?"

In answer, it is proper, first, to explain what recovery of the disease called pleuro-pneumonia is.

To illustrate: suppose, with one-half or two-thirds of one lung solidified, the first effort of nature is to throw around the diseased mass a covering of fibrinous material, entirely shutting off the healthy tissue from the diseased, which is generally accomplished in from fifteen to forty days. Suppuration then commences on the surface of the diseased mass, which continues until the whole is liquified; absorption is constantly going on, and in from six to twenty months the animal recovers, but with the loss of a portion of a *vital organ.* If the animal is a working bullock, its value is destroyed; if a cow in milk, after the acute stage is passed, the secretation is partly restored, and the milk consumed by the people.

Would an intelligent and conscientious physician recommend for a wet nurse a person with an abscess or abscesses in the lungs? If not, why is it not equally wrong to use the milk drawn from cows with lungs in the same or a similar condition?

Contagion.—In the first three herds to which the Commissioners were called, it is not probable that contact with diseased animals could be proved. Several months had elapsed since the disease broke out, and as it was in a locality where it was well known that the disease existed the year previous, it is not strange that the efforts made to trace it failed. The statements made to the Commissioners in relation to the outbreak and spread of the disease in and from Ashby are so conclusive that it seems proper to put them in this Report.

The pair of oxen kept at the Box Tavern stable over night on the 24th of March, as before stated, were driven to the farm of Levi Smith, in Ashby. Eighty-six days after, one of the herd of Mr. Smith was attacked. A bull belonging to another party was kept at the farm at the time the ox was taken sick. A few days after, the owner sold him, and he was driven to Sharon, N. H., where, after exposing two herds, he died, as did several animals so exposed in these herds. Much has been said about the disease being generated by bad ventilation. Unless the mountain pastures in New Hampshire, the hills of Ashby, the large, clean barns, (the doors of which had not been shut for months before the disease broke out,) and the hills and valleys of Deer Island require better ventilation, the theory that the disease is caused by bad ventilation must be abandoned.

The Commissioners visited New Hampshire to learn if the reports were true that the disease had broken out in pastures in that State. On arrival at Peterborough, information was received that a board of cattle commissioners had been appointed by the governor and council, and that Albert G. Scott, Esq., a resident of that town, was a member, who stated that the reports were too true, and much alarm existed among the farmers of that section. On the following day, by invitation of the New Hampshire commissioners, several herds were examined in Hancock and Peterborough. Two animals were selected and slaughtered. The autopsies proved that it was the same disease as in Massachusetts. An arrangement was made with the New Hampshire commissioners, that no cattle affected with pleuro-pneumonia should be allowed to go to Massachusetts, or that cattle which had been exposed in pastures where the disease had existed, or in adjoining pastures, should not be transported otherwise than by railroad, and on arrival in this State to be sold for beef, thereby protecting the farmers on the line of road usually travelled in both States, and preventing the spread of the disease in the localities where the cattle were owned.

Much credit is due the New Hampshire Commissioners for their energetic and faithful co-operation in the endeavor to prevent the spread of the disease in their own State and in enforcing such rules as would tend to keep it from endangering the herds of neighboring States.

Indeed, it appeared to the Commissioners that far less apathy in relation to a matter so serious and vital prevailed in New Hampshire than in many portions of our own State. It is easy for newspaper writers to hold up any subject to ridicule, and for careless and unobservant persons to sneer at what they do not understand; but it remains, nevertheless, true that no one has seriously and candidly examined into the character of this disease, no matter what their preconceived notions and opinions, who have not been forced to confess that no measures for its eradication or its prevention should be left untried, nor any care or attention intermitted that may possibly arrest this scourge to farmers, and this fountain of disease to our people.

By order of the honorable council, the Commissioners were "requested to cause such cattle as may be infected, or which have been exposed to infection, with pleuro-pneumonia, to be isolated, to determine the question of the contagiousness and curability of the disease; also, whether for the purpose of working, milking or breeding they have been injured, and to what extent they have been injured by exposure to disease, or by having had the disease; and also to ascertain, by slaughtering them at a sufficiently remote period, whether, and to what extent, their fattening qualities have been injured."

As the experiments instituted are not concluded, the result will appear in a future report.

The amount of bills audited, exclusive of the various sums to which the several towns are liable, is thirty-eight hundred and seventy-five dollars and ten cents, ($3,875.10,) and by estimate, it will require twenty-five hundred dollars to pay the outstanding bills, making the total sum expended nearly six thousand four hundred dollars, ($6,400.) Respectfully submitted.

E. F. THAYER,
CHAS. P. PRESTON,
Commissioners.

To the Senate and House of Representatives:—

GENTLEMEN,—Having received the appointment as Commissioner on Contagious Diseases of Cattle, and not being able to subscribe to the Report which the Board of Commissioners have seen fit to present, I beg leave to submit the following as a Minority Report:—

All must admit the importance of arriving at a correct conclusion in relation to the disease existing among the cattle of the New England States, known as pleuro-pneumonia. For if what is so generally said by those who have had the better opportunity to examine the subject be true, viz., that the future value of the neat stock in this country depends upon the vigilance used to check the spread of the disease by the destruction of the cattle having the disease, or having been exposed to the same, it is certainly difficult to calculate the importance of vigilant action in this direction. If, on the other hand, it be true that all that is necessary is to use the care and precaution used in the treatment of other diseases, then the course which has been thus far pursued by this Commonwealth can be viewed in no other light than that of an unwarrantable waste of property, which if followed may involve the loss of many millions of dollars.

I suppose it not far from a just estimate to put the amount expended by the State, and the loss suffered by individuals to the present time at two hundred thousand dollars, ($200,000 ;) and when or where this expenditure is to cease, no prudent man will venture an opinion. Two years ago the Commissioners announced that they were happy to be able to say that no case then existed in the State that they were aware of, and the public were led to believe that they were finally relieved of the terrible scourge ; and yet there have been since that time more than a hundred cases! Had the present Board been called upon to make their Report two months since, I doubt not they would have been happy in trying to quiet the fears of any of the timid. All at once there breaks out on Deer Island, in one of the better herds, if not the best one in the State, as bad a case as has come under their observation during the season.

Believing that a just conclusion as to the proper course to be pursued can only be arrived at by a careful consideration of the facts bearing on the following questions, viz.: Is the disease contagious? if so, to what extent? Is it curable? To what extent is it fatal? Are the animals affected with the disease worth keeping through a common course of it, either for fattening, milking, breeding, or working purposes? I present the following as all the facts I have been able to obtain.

The first case I was called upon to visit was that of a herd belonging to Martin Beatty, of Lexington, containing thirteen or fourteen head, made up of cows and young cattle. This herd had been isolated some time previous by the order of the selectmen. The Commissioners had continued the isolation, and had, previous to my meeting with them, agreed to kill one cow belonging to Mr. Beatty, and an ox which had been kept for some time in the barn with the diseased cow, owned by Carroll & Nevils. Both of these animals had been in a low condition, but for two weeks or more had gained in flesh rapidly. An examination proved that each had what is called contagious pleuro-pneumonia. That they would have fattened readily was believed on all hands, and their improvement for the two weeks previous to their being killed seemed to warrant that conclusion. Where either of these got the disease, we could not learn. The cow was kept with the rest of the herd, (thirteen, I think, in number,) till some days after she showed that she had the disease, probably till after the time it is generally supposed those affected with contagious pleuro-pneumonia will communicate it to others, and yet no one of the herd with which she was kept had the disease that we are aware of; and perhaps it is proper to state that we kept the remainder of the herd isolated for some time, and Dr. Thayer made a number of examinations before we thought it prudent to take off the restriction.

The herd of Levi Smith of Ashby was the next I visited, from which any facts were elicited that bear upon the questions under consideration. Smith had a herd consisting of eight cows, two bulls, and a calf. There had been kept a pair of oxen belonging to one Willard with this stock, which oxen were purchased in Marlow, N. H., and were kept one night at the Box Tavern with some other cattle which were supposed to have pleuro-pneumonia. I say supposed because no evidence came before us that any one who had any knowledge of the disease had ever examined them, and had it not been for the breaking out of the disease in Smith's herd probably none would have suspected the cattle at the Box Tavern. Some forty days after the above supposed exposure, one of these oxen was taken sick. Dr. Thayer and Mr. Preston had the yoke appraised, killed the sick one and found that he had pleuro-pneumonia. The other ox was taken to Brighton, where he afterwards died, but an examination showed to Dr. Thayer's satisfaction, that he had never had the above-named disease. Some two weeks after the ox was killed, the Commissioners were called to Mr. Smith's again and found one of the cows quite sick. We had the whole herd appraised, killed the sick cow, (she had pleuro-pneumonia,) ordered Mr. Smith to isolate his herd by building a double fence on the side of his pasture where other herds were kept. One of Smith's bulls had been with the cows of Mr. Asa Walker till it showed symptoms of the disease, coughing and the like, and the Board directed these cows to be kept isolated. On the fourth of July two of Smith's cows were brought to Newtonville to be placed with four cows brought from Maine to try the effects of an exposure; both these cows were killed on the thirteenth of July and found to have had the pleuro-pneumonia. Of the experiment I shall speak hereafter. The remainder of Smith's herd was killed in August; all except one cow and the calf were diseased. What this herd would have been worth to have kept it of course would be presumptuous to say, for there was no pains taken with the milking; the calf which was nearly three months old went with, and of course drew his food from, as many of them and at such times as inclination led him thereto. Smith considered the milk of no value except to feed swine upon, and the cows were from all these reasons used in such a manner as would have ruined any cows for the season. It should be noted that the calf both before and after being killed had the appearance of having been perfectly healthy; also that the neighbors' cows that were exposed to Smith's bull, six and probably nine in number, have never shown any signs of disease; and further that a bull that was kept at Smith's place for some time after the ox was taken sick, is said to have died in about ten days after being taken away, having given the disease to each of the herds with which he came in contact in Sharon, N. H. What reliance is to be be placed on this story is for others to decide; I record it as it was told. Smith says in relation to this bull that he never came in contact with the sick ox, nor with any other of the sick cattle of his herd. It is conceded that no one of the above-named herd would have died of the disease except the ox first taken and the cow that was killed on the 23d of June, nor was it thought by Dr. Thayer that *she* would have died but for the presence of a quantity of masticated grass found in the bronchial tubes.

This is the only case to which we have been called where we were able to trace even a probable connection between the disease found, and any other herd. It is for others to judge how conclusive the evidence in this case is.

George Nelson, of Lincoln, had a herd of about twelve head, which were isolated by the selectmen, and turned over by them to the care of the Commissioners. Two of the cows had died, and one was sick at the time Dr. Thayer and Mr. Preston first visited the place. By their order the herd was appraised, and kept isolated; the sick cow was killed, and found to have had pleuro-pneumonia. Dr. Thayer visited the herd several times, and examined it carefully. On the 29th of June the Board, by his advice, returned to Mr. Nelson all his herd but three cows; but on a subsequent visit it was decided to take one other cow with these three, and have them slaughtered in Brighton. Three of these cows showed the effects of diseased lungs, the other was perfectly sound; in one, the lung on one side was nearly wasted, there being not more than one-third of its proper size left, and that a hard lump adhering firmly to the ribs. I do not hesitate to say that had either of these animals belonged to me, and been fat, I should have used the meat for food, without apprehending any injurious effects therefrom. So I think most of the farmers in this Commonwealth would have done. That they would have fattened readily, all the testimony that has come before us goes to prove; indeed, much of it is to the effect that cattle after passing the acute stage of the disease, fatten more readily for having had it.

I deem it proper to take more particular notice of Nelson's herd, because I have so often heard it mentioned as furnishing evidence sufficient to prove that cows affected with pleuro-pneumonia are not worth keeping for milking purposes. The facts in the case are simply these: From the time the Commissioners took possession of Nelson's cows till they were returned to him, and the four cows killed, he took care of them for the State, charging for his trouble and whatever it cost to feed them, on grass, hay, and meal, giving the State credit for what so much of the milk as was deemed fit to sell brought; and the result was that the cost of keeping was much more than was realized from the sale of the milk. Now, without going into an argument as to whether herds of cows would generally, if kept in this manner, pay for their keeping, leaving out of the account the value of the manure, it is sufficient in this case to state the facts, that Nelson said, repeatedly, that the cows, for some reason, gave but little milk; that he could see no difference in them in this respect. Dr. Thayer examined them again and again, and could detect no trace of the disease in but four, and in one of these he detected it where it did not exist. To state the case in a different form: three of the nine cows, (I think there were nine left after killing the first one,) had pleuro-pneumonia. None of them paid for their keeping; *ergo*, cows that have the pleuro-pneumonia are not worth keeping! So easily do men become the dupes of their own prejudices! To such ridiculous shifts as these are men driven who have a theory to maintain which they deem of vital importance! It may be said that perhaps the remainder of the herd had the disease; but one of them, at least, did not have it, and the evidence is, that no difference existed among the herd as to the falling off in the milk.

Not a little excitement existed in Lexington in regard to a herd belonging to T. E. Cutter, from which several cows had died during the spring and summer. The Commissioners had the herd isolated, and at a subsequent visit one of the cows was found to be very sick. It was thought best to have the whole herd, consisting of thirteen cows and a bull, appraised and killed at Brighton, where the meat of the healthy portion could be readily disposed of. All but four of the number proved to have had the disease. The only facts I deem it worth recording here in relation to Cutter's herd are, that Cutter declared that neither of the cattle killed at Brighton had ever shown to him any symptoms of the disease, though he had watched them closely, and had had that experience which having the disease in his herd six or eight months would give; and that he did not mention as a fact that the cows did not pay for their keeping, but on the contrary, complained of the loss he should suffer by being deprived of the milk of so good a herd. Let it be borne in mind, that eight of this herd had had the pleuro-pneumonia for months.

July 15th we visited the herd of Oliver Meade, of Boxborough, consisting of two cows, and some dozen young cattle. Meade had lost two cows, and the selectmen had compelled him to shut up in his barn the remaining two. On inquiry it was found that one of these cows and a two-year old had been purchased of his brother, who lived about a mile distant, which brother sometimes traded with Lexington people, and during the past season had lost an animal of some disease. These were deemed suspicious facts, and the cow bought of the brother, though appearing to the inexperienced to be perfectly healthy, and the one by her side which was evidently diseased, were condemned. The young cattle were taken from the pasture and kept in a stable for two weeks, that Dr. Thayer might have a good opportunity to examine them; and that other herds might not be exposed previous to such an examination. On our visiting the place, two weeks afterward, one of the cows was dead. The young cattle were examined thoroughly, particularly the one bought of the brother, and also the remaining cow. The doctor thought she must have the disease in the chronic stage, being positive that she had a slight adhesion on one side, and there seemed to be no other way to trace the disease, as none of the young cattle had ever shown any symptoms of the disorder, and they had been kept all winter in the barn, with the one bought of the brother. The three cows, which Meade had owned for years, were dead. The lungs of one of them Dr. Thayer had examined, and there could be no mistake about its having had the contagious pleuro-pneumonia. The remaining cow must, as he thought, be the dragon that brought the trouble into the family; and though she stood a perfect picture of innocence and health, was condemned. But alas for science! her lungs proved to be as clean as her countenance, and we poor mortals were again afloat as to the evidence. To make the matter still worse, it was found on hearing all the testimony in regard to the brother's animal, that something else than pleuro-pneumonia must have been the trouble with it. To relieve us from the terrible dilemma, the veterinary surgeon of Boxborough suggested that Mr. Meade lived on a road over which cattle were sometimes driven on their way to and from New Hampshire, and what more probable than that some of them might have had the disease, and stopped long enough at Meade's barnyard to have left it! The *great mystery* was solved, and we left! Let it be born in mind that there was no evidence that the disease called pleuro-pneumonia had ever existed in any other herd than Meade's, kept in the neighborhood of Boxborough; that Meade's cows, beyond a question, had the contagious form of the disease; that he, or his neighbors, raised his whole herd, except the two animals before mentioned, and *they* were free from the disease; and it will be seen at once that it was necessary to adopt the theory of the old negro, the veterinary surgeon referred to, or some similar one, or the doctrine of the exclusive contagiousness of the disease must be abandoned.

On the tenth of November, just as we were settling into the belief that we had effectually checked the spread of the disease, not having had a fresh case for three months, Dr. Thayer decided that the herd belonging to the city of Boston, kept on Deer Island, was seriously affected with pleuro-pneumonia. The Board was called to confer with the directors of the house of industry in relation to the matter. After a consultation in which it was suggested by some of the directors, and, as I thought, generally assented to by their board, that Deer Island was just the place to try experiments as to the disease, it was agreed on our part with Mr. Payson, with whom the city authorities had left the whole matter, so far as they were concerned, that on the Tuesday following (this was on Saturday,) the Commissioners would go to Deer Island, have the herd appraised, Dr. Thayer would examine it carefully, and the State should take that part of it in which he should find any evidence of the disease existing, and the city should hold the remainder.

Mr. Payson was to keep the whole stock without food from Monday night till we should arrive on Tuesday, that the doctor might have the better opportunity to detect any trace of disease. From some cause, never satisfactorily explained, I found on arriving on Deer Island on the day agreed upon, that the programme had been entirely changed, and the Commissioners had agreed, without consulting me in relation to the matter, to take the whole herd, and have it slaughtered, unless Mr. Payson should see fit to select some of it to keep, it being understood that should such part of the stock as he might select thereafter have the pleuro-pneumonia, the State should pay the city the amount at which they were appraised. Against this arrangement I felt it my duty to protest, because I deemed it a matter of great importance to the Commonwealth that the question should be fairly tested, whether cattle affected with this disease are worth keeping. We had been requested by the governor and council to test, as best we could, this and other points. Up to this time we had labored under difficulties which here would be entirely overcome;—such as finding suitable persons to take care of, and places to keep such cattle in, without exposure to others. Here was a herd of valuable cattle, cows valued by Mr. Payson at from eighty to one hundred and fifty dollars. Certainly if any animals were worth keeping through a siege of the disease these were. Perhaps on no other farm in this State is there that precise care taken of stock, so as to be able to tell the profit or loss attending it; no one could here complain of the danger of exposure to other herds, this being the only one on the island. In short, if there be a place in this Commonwealth where such an experiment can be carried on successfully, it would seem that Deer Island is that place; or if there be any cattle worth thus experimenting with, such stock as they had there is that stock. It had been found that in many cases where cattle were killed the effects of the disease were so slight that no one would pronounce the beef unhealthy for food. Mr. Payson had killed an ox of this herd that Dr. Thayer, as a physician, had advised him to use. I proposed that if this herd must all be slaughtered, the stock appearing to be healthy be held by Mr. Payson, so that should there be any such cases as referred to, the State might not lose their whole appraisal; the Commissioners having previously decided that the law did not allow them to dispose of the beef when the slightest trace of the disease was found. But this proposition was rejected. In a single day's slaughtering were found two oxen appraised at two hundred and forty-seven dollars and fifty cents, ($247.50,) and would have brought more than two hundred dollars in market; which both my associates decided they should not hesitate to eat or give to their families, but which we could not sell. The herd was slaughtered, with the exception of four cows, two yearlings and a calf; and these were saved, not as the report of the Commissioners might lead one to conclude, for *them* to try an experiment with, but because Mr. Payson would rather run the risk of their having the disease than to suffer the loss he would, if he accepted the appraisal. Fourteen of the thirty-five slaughtered by the Commissioners were more or less diseased; two of them would probably have died.

Up to this time not the slightest evidence has been found that the disease had been brought to the island from other herds; and yet several of the daily papers of Boston published articles calculated, if not intended, to lead the public to believe that the disease had been traced to a yoke of oxen bought of a man in New Hampshire, who, four years ago, sent the disease to Quincy. It is true that the lungs appearing to have been longest affected were taken from a yoke of oxen Mr. Payson bought last May of a man bearing the same family name of him who it is said sold the cattle which caused the trouble at Quincy in 1861. But it is also true that the oxen bought by Mr. Payson had stood in the same stable, eaten at the same rack, drank at the same trough, worked in the same field, and been with through the entire summer, three or four other yoke of oxen, all of which were killed, and no trace of the disease found. It is also true that they had never been with any other cattle of the diseased herd; were kept in a barn separated from them by a distance of several rods, and the only possible exposure there could have been from them was in that they all drank at the same trough, but never at the same time. It is also true that Mr. Payson had worked these oxen through the entire season without having had the least idea of their having been diseased. He says that some time during the summer *one* of the oxen did not thrive as well as he thought he ought to have done, and he ordered a little more grain put into his food. These facts are worth noticing, as tending to show the value of such cattle for work. Still, again, it is true that the butcher employed on this farm says that he killed an animal from this herd more than a year ago whose lungs were affected in precisely the same way that those were which the Commissioners decided had the pleuro-pneumonia. But his story was not believed. Ah no! for it ran counter to the popular theory in regard to the disease. The tale of any old gossip, nay, even the "heard tell" which dame Rumor so generally employs, is sufficient to prove that the cattle at the Box Tavern were the means of giving the disease to Smith's herd. But here, a man who says he examined the lungs carefully, and certainly had perception enough, if ever he had seen *one* good case of pleuro-pneumonia, to know another case, is doubted. The old lady could not be made to believe her son's story of the wonders of the sea, though told with moderation; but when he told her of the great gold chariot-wheel which they fished out of the Red Sea, stamped with Pharaoh's name, she could believe, because she had read in the Scripture about its being lost there. There is still another fact in relation to the Deer Island stock worthy of notice, viz.: seven of the ten cows killed by the Commissioners, and found diseased, had passed from the acute to the chronic stage of the disease without Mr. Payson's notice, either by the falling off in their milk, or in any other way; a fact which carries additional weight when we remember that Mr. Payson is not one of those "guess so" farmers, but one who takes just pride in pointing out each cow in his herd, and referring to his memoranda, states the exact amount of milk she gave in any given month, and the butter made therefrom. One may well ask how can it be that cows affected with pleuro-pneumonia are worthless for milk, when such a man had it in his herd for months, and never dreamed but that he had a healthy herd?

My associates, in their Report, mention the fact that an experiment is in progress to test certain points in reference to the effect of pleuro-pneumonia in cows, and without giving any particulars in relation to the progress of the experiment, intimated that at some future day all the facts shall be made known. It seems to me proper that the facts thus far developed should be reported, and I shall therefore venture to give such as have come to my knowledge.

About the first of July two cows were brought from Smith's herd, in Ashby, to Newtonville, and placed in a barn which had been previously selected as a suitable place to try the experiment. To all appearance this barn is in a healthy locality, and unless the confinement to which the cows were subjected be objected to, I cannot see why it was not a good place for the trial. On the eighth of the same month four cows were brought from Maine, and immediately after their arrival, while in that state of exhaustion which the journey would produce, one of them was tied in a stall between the two sick cows, for twenty-four hours. Each of the Maine cows were similarly exposed. The two cows brought from Ashby were then killed, and found to have been diseased with contagious pleuro-pneumonia. The lungs of one were but slightly affected, but the other had a large portion of one lung diseased. No other animal of Smith's herd, except one cow, was as badly affected, the lung on one side weighing twelve pounds, on the other a little over two pounds. In about forty days Dr. Thayer decided that one of the exposed cows had the disease, and expressed an opinion that two others would have it. Two other veterinary surgeons were quite confident that three of the four cows had an adhesion, but Dr. Thayer has never given it as his opinion that more than one has had pleuro-pneumonia.

Owing partly to an indisposition on the part of a majority of the Commissioners, and partly to a difficulty to find a suitable place, no more cows were exposed till the fourteenth, after the cow at Newtonville was taken sick, when she was carried to Weston and exposed for several days to two cows brought from Upton, and after the exposure taken back to Newtonville. Neither of the Upton cows had shown any symptoms of the malady up to the time the disease was discovered on Deer Island, (nearly three months,) and it was thought best to expose them to an animal from that herd. Accordingly, Dr. Thayer selected an animal which he pronounced perfect for the purpose, had it carried to Newton and exposed the cows there to his satisfaction, when the animal was killed and found to have had the disease in its worst form. It is supposed that there has not been sufficient time since the last exposure to indicate the effect.*

To sum up the result, we have exposed in the manner I have stated six cows; one only has had the disease; three of them have had the double exposure of having two cows affected with the disease tied on either side of them for twenty-four hours, in such a manner as to make it certain that they should inhale the breath of the sick ones, eat the food that the sick one had breathed upon; and also of being kept in the stable with one diseased cow through the whole course of her sickness, with the exception of two or three days. In about twenty days from the time the cow brought from Maine was taken sick, Dr. Thayer told me she gave about the same quantity of milk that she did before her sickness, which certainly was a little singular, as every farmer knows that if, from any cause, a cow falls off in her milk for any considerable number of days it is not often she comes up to the same mark without a change in the feed, and there was no change in this case.

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* Since writing the foregoing, I learn from Dr. Thayer that the "Upton cows" were exposed to the animal from Deer Island for two weeks, it having been tied between them during the whole of that time. Sixty days have passed since, and neither of the cows has shown any evidence of having had the disease, unless a slight cough in one of them may be considered such. Forty-five days is the extent of time fixed upon as the time of incubation.

Such are all the facts bearing upon the points named in the first part of this Report which I have been able to gather. Meagre, I know them to be; so meagre that he must be a rash man who would attempt to build any theory thereon. It would seem to me that they rather tend to a disbelief in the present popular theory in regard to the disease than to furnish the material to build a new one. But I do not feel that I am wholly at fault that they are so comparatively unimportant; more than once have I proposed that we call to our aid some man of acknowledged medical skill and scientific ability. But all such propositions have ever met with disapproval. It certainly is consistent in him who has no faith in medicine to refuse to call a physician, and equally so in him who believes he knows as much as any one, to ask advice of others.

I do not hesitate to say then that the experiment at Newtonville has proved of but comparatively little value. My associates have no faith in the use of medicine for the disease, and still more, they think that he who is not already satisfied that the only proper treatment of a herd effected, is to have it immediately slaughtered, is not worthy of the pains it would require to convince him. Men having such views cannot be expected to carry on an experiment with that interest necessary to elicit the truth; nor can it be expected that farmers who have their herds appraised at what three disinterested men swear is a fair market value will make much effort to prove they are worth keeping, when they know that a majority of those who are to judge between them and the State consider it worse than useless.

It is asserted, and I suppose generally believed, that the disease has no parallel in the human or brute creation. I have said that the proposition to take counsel of experienced medical men had met with no favor with the Board. The only testimony I have therefore on this point is the opinion of one who has had no little experience, and in whose judgment I have that confidence which leads me to trust my own and the life of my family to his skill, who gave it as his opinion on an examination of one of the more thoroughly diseased lungs we have taken from any animal, that there was nothing about it that he should not expect to find in an acute case of the lung fever. Let no one suppose that I offer this opinion thinking it of much value; for I do not even consider, what is so often and triumphantly referred to, the opinions of Tom, Dick, and Harry across the water, worth considering for one moment, when we can for a tithe of the money which has been expended by the Commissioners in a single year, by properly conducted experiments place all the questions of interest in relation to this disease, and its effects forever beyond the need of an opinion. It is not many years since the whole medical faculty of the old world stood aghast at the virulence of a disease which to-day is but little feared by skilful medical men, either there or here. Nor is it long since he would have been set down as a simpleton who ventured the opinion that any one of many of the diseases not now classed among contagious disorders, was other than purely so. If it be proved that pleuro-pneumonia never appeared in this country until Chenery brought it from abroad, it does not follow that it is not *now* an epidemic. Nor does it follow, by any means, that because the veterinary surgeons of this country have found no remedy for the disease, therefore it cannot be cured, and, that too, so readily as to make it the part of folly to slaughter every herd in which it appears. Certain it is to my mind that not twenty, nay, nor even a hundred thousand dollars will drive the disease from this State if expended in the manner it has heretofore been.

Many times have I been warned against doing anything which might jeopardize the farming interest of this State, or the health of the people. I am a farmer, and what is more, one who believes that whatever effects their welfare is of vital importance to the Commonwealth, nor would I say one word which I believe could possibly endanger the health of one of the humblest of our citizens. But I can but think it necessary, that the whole truth in regard to this disease be brought to light. I do not deem it proper to enter into an argument as to the best course to be followed in relation to the disorder, but simply to give you the facts as they have come before me, trusting that the legislature would search out any defects that may exist in the present statutes bearing upon this case, and apply the remedy. Let me suggest that if the present system of slaughter is to be continued, that the law be so amended as to enable the Commissioners to sell for meat such beef as they may deem perfectly healthy for food.

I annex hereunto a copy of each of the Orders [*] passed by the governor's council, intended as it would seem to be a guide in some degree for our action. There can be no possible doubt but that the course therein indicated could be carried out with perfect safety to the community. Nor can I for a moment question whether a series of experiments, if made by men competent to make the same, would ultimately be the means of saving a vast amount of property to the Commonwealth. Certain is it that the public would then have the satisfaction of *knowing* what had better be done instead of groping where, at best, all is mere conjecture.

F. D. LINCOLN.

BRIMFIELD, January 7, 1865.

I have been desirous from the first to embody in my Reports a full history of the proceedings on the part of the Commonwealth and individuals acting in any official capacity, in regard to this disease. It is for that reason that I have delayed the printing some days to give place to the above report of the minority. I will not allude to its general tone of gross injustice to Dr. Thayer, whose long experience and observation of this malady would seem to entitle him to be treated with respect, at least, by a colleague just appointed upon the commission, with no previous observation of the disease. Every one who knows the competency of Dr. Thayer and his eminent fitness for the position he holds upon the commission, will entertain the fullest confidence in his skill and judgment, in the performance of his duties. He is well known to be better informed in regard to the disease and the facts of its more recent history than any other man in the Commonwealth. It is but fair that he should have an opportunity to correct many of the statements so well calculated to mislead, and I therefore give place to the following communication:

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[*] The substance of these Orders is given on page 12, in the report of the majority.

Dear Sir,—I wish to review, in as brief a manner as possible, the minority report of F. D. Lincoln, Commissioner on Contagious Diseases of Cattle. Passing over the few first pages, in the 14th, he says, "There had been kept a pair of oxen belonging to one Willard, of Ashby, which were supposed to have pleuro-pneumonia. I say supposed, &c." The facts are, and we had the evidence of several persons, that while a pair of oxen was being driven from Concord, Mass. to Stoddard, N. H., one of them faltered and was evidently sick,—was put up at the Box Tavern stable. Sometime after, a disease broke out in the said stable; a cow in the stable was sold to one Shelden, in Hancock, who sold her to Washburn, who sold one from his herd to Hayward, a neighbor, who had lost eleven head of cattle at the time of our visit to New Hampshire, he, Hayward, sold one to one Hadley, of Peterborough, who owned the pair of oxen alluded to in the majority report. Mr. Lincoln had the same opportunity to learn the above history of the spread of the disease from the Box Tavern as I did. It is said that "there are none so blind as those that won't see."

At page 17th he says that Dr. Thayer examined (the cows at Nelson's, in Lincoln) again and again and detected the disease in one where the disease did not exist. It appears to me that if a man wishes to overthrow an old theory, built upon an experience of five years, with all the evidence that could be obtained, it would be far better to state facts, or at least to learn *the* facts, so as to be able to state them. The truth is, I did examine them again and again, and was unable to detect disease in but three. The fourth, although liberally fed, did not thrive, the owner often stating that she must be diseased. Knowing that in many subjects the disease does exist, either in remote situations from the surface, or in so small a space that the usual examinations fail to discover it, it was thought best to slaughter the animal. So much for the statement so sneeringly made. Again on the same page, Mr. Cutler complained of the loss he should suffer by being deprived of so good a herd. It is not to be wondered at that he should; his herd originally consisted of twenty-five animals, and nearly one-half he had already lost, another was sick and certainly would have died, the commissioners then took possession of the herd, which then consisted of fourteen head.

Again in relation to Mead's herd, a gentleman informed us that an ox was killed at a slaughter house in Acton, belonging to a brother of Mead, said ox had a diseased lung, to an extent that the butcher refused to have anything to do with the meat. On our arrival, it was found, as stated by Mr. Lincoln, that there were two cows tied up by order of the selectmen. The cattle belonging to his brother were examined, the owner and the neighbors questioned, but no satisfactory evidence could be obtained. It was resolved to have the the dead cow exhumed; on examination, the wall of the thorax had been removed on the healthy side, but the diseased lung had not been seen; it was removed and found to be consolidated. The disease of which the animal died was contagious pleuro-pneumonia. The remaining cow was examined, and it was supposed had the disease in a chronic form. Whether she had or not, it would have been necessary to have removed her, from the fact that she had been tied up by the side of the acutely diseased one for several days, which cow finally died. It is more than probable she would have had the disease, and as there was but one, the expense attending the keeping and the necessary examinations, would far exceed the value of the animal; for that reason she was killed. Again he says, in relation to the herd at Deer Island: "It was agreed on our part with Mr. Payson, with whom the city authorities had left the whole matter, so far as they were concerned, that on the Tuesday following (this was on Saturday) the commissioners would go to Deer Island, have the herd appraised, Dr. Thayer would examine it carefully, and the State should take the part of it in which he should find any evidence of the disease existing, and the city should hold the remainder." It is true that in conversation with the directors, some one remarked that Deer Island would be a good place to try the experiments. The question was asked what would be the best manner of disposing of the herd. The reply was that the most economical was slaughter, there being many animals among them valuable for beef, which had not yet shown any symptoms of illness, and that the period of time had passed for attempting to save them by separation. The question was then put by the president, and it was decided to refer the matter to the president and superintendent. The president afterwards left the management of the subject on their part to Mr. Payson, with full powers. It was then agreed to have the cattle appraised and examined on Tuesday, Mr. Payson declining to make any proposition until then (Tuesday). On our arrival at Deer Island, Mr. Payson came forward and stated that he thought it best for the State to take the whole, unless that after seeing the lungs of those we might kill, he would take six or eight which were the least liable to have the disease. Accordingly three Jersey heifers (the least exposed of any in the whole herd), and five cows from the infected barn, were selected by Mr. Payson, who several times remarked that certain cows, pointing them out, would not have the disease, having constitutions strong enough to resist it. Without going into any elaborate argument about experimenting at Deer Island, suffice it to say, that it would be highly improper to use that place for experimenting, as proposed by Mr. Lincoln. On the island is an institution containing from six to eight hundred people, requiring the milk of more cows than can be pastured there in summer, and unless the milk of the diseased ones was used (and who would dare to take the responsibility of allowing the milk to be used under such circumstances), the institution would be deprived of one of the most important products. It is well known that if a disease breaks out in one of our correctional institutions (as for instance at the State prison a few years since) more is said about it than there would be if any number of children in other circumstances should be attacked with disease by eating the products of diseased cows; and if an epidemic should break out on Deer Island, while the milk in question was being consumed, much censure would be cast upon all the parties concerned.

From the want of time necessary, it is impossible to notice all the inaccuracies, misstatements, and fallacious reasonings in the minority report. A few lines relating to the experiment will suffice. In a note on the 23d page is the following statement: "Sixty days have passed since, and neither of the cows has shown any evidence of having had the disease, unless a slight cough in one of them may be considered such.

The facts are, that the calf was carried to Weston on the night of Nov. 21, and was kept two weeks and one day, between the two cows. On the 12th of January one of them coughed several times when I was present. Mr. Jacobs, who had the care of them, stated that she had coughed considerable for some days. On the 17th he informed me that the day before, the other cow first showed the same symptoms of illness that the calf did, and was quite sick. The present symptoms are, Jan. 18th: the animal stands with the head drooping, the hair standing up, coughing almost incessantly, considerable loss of appetite, and on being turned out of the cow-house to drink, is hardly able to move so great is the debility. It will be seen that forty-two days after the removal of the calf and but fifty-seven from the time of its being first placed with them, before unmistakable symptoms of thoracic disease were present.

To sum up, it is probable that at least, four if not five of the animals exposed, took the disease. I am not so presumptuous as to pretend, in all cases, to diagnose the disease in question, and he must be an expert in pathological anatomy who, as Mr. Lincoln states, decided on the examination of *one* specimen of a diseased lung with contagious pleuro-pneumonia, "that there was nothing about it that he should not expect to find in an acute case of lung fever." E. F. THAYER.

PUBLIC MEETING OF THE BOARD AT GREENFIELD.

The meeting of the State Board was held this year at Greenfield, December 13, 14, and 15, and was very well attended, not only by the members of the Board, but by the farmers of Greenfield and vicinity. His Excellency, Governor ANDREW, occupied the chair during the first day.

The sessions commenced on Tuesday afternoon, December 13, at Franklin Hall, where the opening address was delivered by Dr. LORING.

ADDRESS OF DR. GEORGE B. LORING.

Gentlemen: The success which attended the first meeting of the Board, for the purpose of lectures and discussions on agricultural subjects, held at Springfield last year, established the propriety of such exertions to diffuse agricultural knowledge throughout the Commonwealth. We had the pleasure of listening, at that time, to the rules which science has endeavored to establish, by careful and accurate investigations into the processes of nature, upon which the farmer depends for the prosperity of his labors. The properties of the soil, and their relations to a fitness for the various crops, as defined by chemical analysis, were laid before us with great clearness and ability. The use of fertilizers in the way considered by science to be the most effectual and economical was developed with striking method and precision. We listened with profound admiration to the recital of those discoveries in embryology, which seem to promise the establishment of fixed laws by which the farmer can increase and improve his flocks and herds. And we heard with real benefit the details of those practices, by which the diligent and intelligent farmer has arrived at some remarkable result, and has proved to the world by a successful experiment, some law of reproduction which the theorist had "sought but never found." In the debates and lectures there was an admirable combination of the knowledge which had actually served the purpose of some practical farmer, and which he had acquired in the pursuit of his calling, and that knowledge which, starting from abstract principles, only requires the confirmation which practice alone can give, to become a blessing to mankind.

Representing, as each one of us does, the agricultural societies of the State, and calling together the farmers of the neighborhood, we had an opportunity to test the comparative value of the two sources of knowledge to which I have referred. And in the comparison, I think neither side was the loser; and I am sure no representative of either side retired from those discussions without feeling that he was under obligations to the other. The union of the knowledge of the schools, and the knowledge of the field, of the agricultural college and the agricultural society there witnessed might have taught any fair and intelligent observer that in the great work of agricultural education the two may and should go hand in hand.

There are those, I know, who think otherwise. Whether it is their superior knowledge of the business of agriculture, their unusual success in the work of husbandry, their remarkable ability to judge of the qualities of cattle, the most advantageous crops, the most profitable animals for a given locality, the most economical cultivation, or their ignorance of both science and practice which has brought them to this conclusion, I will not undertake to say. I find the enterprising and intelligent leaders of agriculture in England and America, those men who believe in developing the resources of these two countries by the diffusion of useful knowledge in matters of farming, ever ready to record and consider the experiments of practical men in their fields and stalls. Throughout the most useful agricultural literature of these two countries, I find diffused the results of experiments in every conceivable branch of husbandry. If I would know the comparative value of the various modes of preparing food for cattle, the effects of various combinations of food, tested by careful weight and measure, I have but to turn to the statements drawn up and recorded by those who knew how to select animals for feeding, and who, having written down the results of their observations, offered them to some agricultural society either at home or abroad for publication. If I am at a loss to know what mode of cultivation, and what crop are peculiarly adapted to any given piece of land, I need not search in vain through the transactions of agricultural societies. It may be difficult to establish by mathematical tables the precise cost of any crop throughout any large territory, because nature has her own mode of working in every locality, on hillside and in valley, on northern and on southern slopes, on the seaside and on inland plains—but I can lay aside my arithmetic and having learned the precise spot on earth where my labor is to be applied, I may get my lesson of those whose agricultural lot in life is analogous to my own. Shall we then reject the transactions of the Royal Agricultural Society, the various treatises on practical agriculture, all the record of the founders of breeds of cattle, the reports of local societies in this country, the compilations and essays of secretaries of the various boards of agriculture among us, simply because they have not received the sanction of a professor in some experimental agricultural college, or because the officers of such an institution have no faith in the information which an observing and successful farmer acquires as he goes on with his work ? That system of education which is based upon the assumption that all beyond its limits is profound ignorance, can hardly succeed in guiding the mind of man aright. And the president of an agricultural college who shuts his eyes against all the practical information which has been collected into the form of a text-book of agriculture, must be careful lest he lose himself in his attempts to judge of the occupants of a barn yard, and lest he find with astonishment that the crops of surrounding farms far outstrip those which lie beneath the shadow of his own institution. It is not to be supposed that the agriculture of our country is waiting for that light alone which is to radiate from the schools. We have already accomplished much; and the school which is successful will take its departure from the facts now established by long experience. In this way, and in this way alone, can it be useful to a community of farmers. We must at least use the knowledge we now have, until we are offered something better.

The truly scientific man feels and knows this. He knows the value of what has actually been done on the farm. And while he patiently pursues his investigations, he never loses sight of the point of his departure, nor forgets that he must return to the farm, in order to ascertain how his labors may be useful and valuable.

In discharging our duty as a Board of Agriculture, we are called upon to be especially observant of the practical operations of farmers themselves, at the same time that we endeavor to collect and diffuse all the valuable explorations of science. But inasmuch as we have the farmers for our constituency, I propose in opening the discussions of the present session, by dwelling upon the general business of managing a farm—that business which is alone universal—that business which belongs to every people and varies as their soils and climates and tastes and necessities vary—that business which lies at the foundation of all others, and which although pursued sometimes rudely and sometimes with the utmost skill, never fails to bring with it a permanent and even prosperity.

It is indeed the chief business of the world. Those nations which have of necessity adopted it as the great means of subsistence, have endured the most devastating wars, civil and foreign, with comparative impunity. While the great manufacturing and commercial cities and nations of olden times, have succumbed either to the destruction of internal dissentions or to the waste of foreign invasion, the agricultural people and kingdoms have flourished with almost immortal force and vitality: Tyre and Carthage have hardly left a trace of their ancient splendor. Venice has long since sunk. But Egypt still has her granaries and crops, as when the sons of Jacob sojourned there to procure food for their improvident tribe. China has been devoted to agriculture for more centuries than are recorded in human annals; and her empire is now opened to reveal the astonishing wealth of her rural population and the superior excellence of her farming. France has been borne by her farmers through revolution after revolution, filled with that recuperative energy which belongs to that people who cling to the soil. England owes her stability not to her mills, which totter before every starving mob which a civil convulsion rouses to madness, not to her ships dependent upon the prosperity of others for their activity and profit, not to her banks which fluctuate with the rise and fall of every military movement or every financial crisis; but to her lands, to those homes of a rural population, to the broad acres groaning with the weight of crops — the wealth of accurate, systematic, careful and vigorous agriculture.

In our own land, the large majority of the people, the great mass of wealth, the largest part of the energy, are devoted to tilling the earth in some form or another. The number of farms in our own State is about 36,000 — $109,000,000 is invested in these farms alone, over $3,000,000 in tools and machinery—$9,600,000 in live stock. The amount invested in farms in this State is usually about one-sixth of the whole amount invested in manufactures throughout the Union.

I state these striking facts to show you that you belong to a most important branch of the business of the world—to that business without which the prosperity of peace would be blighted, and the adversity of peace would become intolerable—without which no civil institutions could exist, and which is the only national support in times of strife. I think you will agree with me, therefore, that an agricultural population should be the most successful, the most reliable, the most intelligent, the most industrious, the most grateful to that kind Providence whose goodness is always spread before them in abundant and large luxuriance, the most prudent and careful amidst all these bounties.

In order to discharge the duty which devolves upon a member of this most substantial and least precarious of all branches of business, we must understand thoroughly how to manage a farm.

How to manage a farm! Surely this is easily answered, I am told. Any man endowed with ordinary physical faculties and common intelligence can conduct the business of farming in New England, you will say. The intricacies of business may indeed overwhelm a man. The cares of a profession may be beyond his management. He may be stranded ere his voyage of life is half over, upon some unknown and unexpected shore. But to manage a farm, how simple, how easy is the process!

Now is this so? Are you not aware that as a general rule our agriculture is lying torpid, in the hyperborean winter of neglect and indifference. Why, gentlemen, the shop of the mechanic is looked upon as of more real value to-day than the acres of the farmer. The young man, who sits day after day at the window of yonder little edifice, devoted to his journey work, looks out with a sort of compassion upon him who, less favored, passes along the road to his daily toil upon the land. Farming is made subservient to every other calling. It is conducted too often with less skill than any other calling; not because it is easier, less intricate, simpler, but because it is more complicated, requiring quick perceptions, a steady eye, a ready hand, judgment, foresight, thought, care, management. It is easier, let me tell you, to make a shoe or a chair, than it is to raise one hundred bushels of corn to the acre, or to feed a cow profitably upon the crops from your own land. A gentleman once showed a capitalist and merchant of Boston, a farm of five hundred acres, which it was necessary for him to manage, and he exclaimed that he had got intellectual labor enough before him to occupy the mind of any one man. He thought his ships, his stocks and insurance complicated and trying enough—but the farm more than all. And have you not seen how like magic a tract of territory would improve year after year under skilful and well applied labor? Have you not before your own eyes the contrast between energetic and active farming, and the more sluggish operations of too many of your neighbors?

How to manage a farm, then, is not the simplest and easiest thing to do—not the simplest and easiest question to answer.

Men buy farms indiscriminately, too often injudiciously,—careful enough, perhaps, about the price, but careless enough about the quality and location. There is just as much difference between a good farm and a poor one, as there is between a good ship or a good cow and a poor one. It is not every acre of land in every locality which will pay for good husbandry. A farm should be chosen, then, with reference to locality, whether near to or remote from a market; with reference to the soil, whether light or heavy, warm or cold, sloping north or south, wet or dry; with reference to the kind of farming to which it is adapted ; with reference to the balance it possesses of land for tillage and land for pasture, of upland and meadow, of woodland and cleared land.

When purchased, it should be devoted to that kind of farming to which it is best adapted. It would be idle to undertake to raise corn on heavy clay soils, or a long continued succession of hay crops upon sands. No sane man would try to raise beef within the sound of Boston bells—and no man would establish a market-garden on the hills of Berkshire. It would be idle to pasture Shorthorn cattle on Cape Cod, and a waste of pasturage to keep West Highlanders in the valley of the Connecticut. We must decide with judgment what our farm is intended for ; and never, until the promise of seedtime and harvest is broken, will that farm fail to respond to well-directed care and industry.

On every farm the buildings should be well located—somewhere about the centre of all the farming operations. A hillside, with a southerly aspect, will furnish an excellent location for the barn, with its cellar opening to the south, and its yard warm and well-protected for cattle. The house should be conveniently situated near the barn ; and if it is adorned internally with taste and economy, and surrounded externally with trees and shrubbery judiciously planted, depend upon it, your reputation as a farmer and a Christian will not suffer, neither will your purse, should you at any time desire to sell your place. But, at any rate, select a cheerful spot, near the centre of your tillage lands. No farmer can afford to haul his manure a mile, when he can just as well use it within a quarter part of that distance. Begin to cultivate directly about your buildings. If you have a lot that is pretty good, yielding a fair crop of hay or corn close at hand, and one not quite so good more remote, it is poor economy to try to make the remote land as good as that close by you—it is good economy to bring the latter to the height of cultivation before your begin upon the former. This can wait for its turn. Cultivate well, then, the best land directly about your homestead. And let your good farming radiate as it were from that centre.

Stock your farm to its utmost capacity, with good animals—the best are the cheapest—feed well, and enlarge your manure heap by every means in your power, with compost, with muck, with loam from the roadsides.

In the selection of animals, too much care cannot be exercised to avoid those which are not adapted to your farm. There is no more pitiable object than a half-starved animal, laboring to supply itself with food on a short pasture, or on herbage not suited to its wants; nor is there anything more unprofitable. If we look about us, we shall find that some breeds or families of cattle thrive in one locality, others in another. There are sections of our State, in which Shorthorns have for many years been profitable, and in which the introduction of pure blood of that breed has vastly improved the quality of the cattle previously existing there. There are others in which such attempts have proved utter failures. In some localities the Ayrshire has found an abundance of suitable food, and without developing an overpowering tendency to fatten, has preserved all the milking qualities for which it is so remarkable in the land of its birth. And without any well-known breeding, some parts of New England, some single farms, have succeeded in developing families of cattle peculiar to themselves, and possessing very considerable merit, and all the qualities which make them especially useful in their own location. It is the animal which thrives well, which is the best choice of every farmer. And whether it be Shorthorn, or Devon, or Ayrshire, or native, it can only be profitable when it possesses its health and strength, and increases easily in growth on the farm where it is to be fed.

It is not size, but quality, which should be consulted by the farmer in his choice of animals. On the luxuriant pastures of the West and South-west, large animals thrive easily, and small ones soon develop a tendency to increase their proportions from one generation to another. But in New England, we can feed smaller animals more profitably; they bear our cold winters better; they subsist more easily on our short pastures; they are usually stronger, more enduring, perform more labor, and afford meat of a finer and more delicate quality. This is a general rule for New England; although there are a few sections in which large cattle have been a source of profit to the producer.

The same rule holds good with regard to sheep and horses; and not without compensation. For while the farmer in Massachusetts is obliged to resign large mutton sheep, he receives more than an equivalent in the heavier fleeces and sweeter mutton of the smaller breeds, which thrive on his short pastures, and on his coarse winter forage. And while he fails to produce the heavy draft-horse of Ohio and Pennsylvania, he can boast of the strength, and endurance, and sagacity, and rapid motion of that horse of all work which grows nowhere so well as in New England.

It is especially important that cattle should be furnished with warm and well-ventilated stables in winter. The cow has not a rapid circulation, nor an excess of animal heat. She does not require much exercise. Her muscular system is not largely developed. And her whole system is better able to discharge the duty of producing milk, while at rest, than under any other circumstances. Her normal condition, in a domesticated state, is repose. She only requires a luxuriant pasture and short journeys in summer, and warmth, and repose, and good feed in winter. She enjoys confinement; and she does not enjoy exposure to cold, nor does she thrive well under it. Animals should be fed with regularity—three times a day being sufficient. And they should be provided with some variety of food. Cattle will thrive, it is true, upon an abundance of sweet, early cut hay, and on that alone. But they can be more economically wintered with a change now and then to hay of a poorer quality, combined with roots, especially if the farm has a supply of poor hay, and is near a good market for the best.

For the bedding of cattle, refuse hay, straw, leaves, saw-dust, sand, &c., can be used. For the health of the animals' skin, the sweetness and cleanliness of the stable, and the benefit of the manure, sand is undoubtedly the best material that can be used for this purpose. A liberal supply of refuse hay, for bedding, very often produces a cutaneous eruption, which is very uncomfortable, and injures the appearance of the animal; and when mixed with the manure, it requires great care lest it create too rapid and destructive fermentation. Sand can be used freely without any of these bad effects. It prevents, more than anything else, the collection of lice in the stables; it keeps the hair and skin of the cattle in good condition, and makes the best compost for heavy lands that can be found. For retaining the moisture, preserving manure from heating, and preparing it for introduction into cold and clayey soils, it is unequalled.

Cattle should be turned to grass pretty early in the spring,—before the grass becomes so luxuriant and succulent as to load their digestive organs with an excess of fermenting juices and to produce an excessively laxative effect upon the bowels. The change from one kind of food to another is, in this way, too great; and it requires many weeks for the animal to regain the tone of the stomach, which has been thus disturbed. It may not be best for the pastures, but it certainly is for the cattle, that they should be turned upon them as early in the spring as the weather will permit. They are thus prepared for the abundant feed of early summer, and will occupy this time in taking on fat instead of regaining their health.

Sheep, like cattle, should be wintered with care as regards feed, and with more exposure. Colts should not be confined in warm stables, nor allowed any other food than the best hay, with a few roots, until four years old, if you would have them hardy and vigorous, and not feeble and weedy. With these few hints on animals, I pass to the land and crops.

Never try to cultivate a piece of land that is saturated with water until you have drained away that water, and as you value your future comfort and profits, do no not be led into using stone drains when tiles can be furnished within any reasonable distance.

The crops to be raised depend very much upon your locality. I suppose grass is the most profitable crop on most lands. At a distance from the market, and on lightish soils, corn is a good crop to raise, especially where it can be fed with cheap hay, and where the farmer must drive a long distance to obtain it if he does not raise it.

When corn is easily obtained in the market and hay is dear, roots are a profitable crop. Indeed a moderate supply of roots will be advantageous to cattle feeders everywhere. I have raised two successive years nearly six thousand bushels of roots on about seven and a half acres of land. I do not think that five hundred bushels of corn would have been of so much service to me in feeding my dairy herd and young stock, even including the fodder which the corn would have produced.

Be not induced to devote too much of your best land to fruit trees. Fruit is an uncertain crop, and you have all seen the old orchard which enriched the father standing in the way of the sons, who cannot bear to cut down the trees which were landmarks to their childhood. Plant a few trees and cultivate them well with bones and lime and ashes, if you want fruit; with barnyard manure and muck, if you want leaves, roots and branches.

Whatever crop you raise, do it well; and expect to have no idle days from the 1st day of January to the last of December. And be sure to farm in such a manner that when you have used whatever of your crops are necessary for the production of manure to enrich your farm, you will have a surplus of marketable produce to sell. And after your farm is purchased and well stocked, let the additional capital invested in it be well directed labor in making fertilizers and applying them, and not in patent manures or fancy crops. The life of a man is too long to allow of his stimulating his lands with guano and phosphates until they are exhausted beyond redemption, and his purse is usually too short. The life of a man is too short to allow of his devoting an acre of land throughout one whole season to a crop which has only a speculator's recommendation and a fancy value.

And above all, keep so far as possible an accurate farm account, and journal of daily events, as the master of a ship keeps his log.

As an additional stimulus to good farming, I would recommend the entry of farms for premium, with the various agricultural societies. I have often expressed my high estimate of the value of the knowledge recorded by careful farmers, and collected by agricultural societies in their reports; and I know of nothing more useful than well drawn statements of the general management of the farm. Some of the most interesting agricultural papers on record are the reviews of farming in the various shires in England, drawn up by some competent person, under the auspices of the Royal Agricultural Society. They present a summary of the soils, crops, animals, geological formation, resources and general condition of these districts of the kingdom. In one or two instances, a similar attempt has been made in this country. The amount of information thus collected has always been great and various; and it has presented that sort of knowledge to the farmer, which would enable him to make a comparison with the agriculture of his own section, and receive valuable suggestions from it. So of the reports of farms. The details of the cultivation of a good crop of corn are always interesting and instructive. The mode of restoring pasture lands, which has met with a good result, is of value to every Massachusetts farmer. The rules by which any breed of cattle or sheep has been developed and improved, are always attractive and useful. And there is no single operation in agriculture, whether of drainage, or tillage, or manuring, which does not require the most careful investigation, and a record of which will not secure the attention of every enterprising husbandman. But no one of these involves the whole business of farming; and each experiment or operation may have been carried on in the midst of very poor and very unprofitable general management. The recital, therefore, of a successful farming operation as a whole, is what we most need. He who has learned the best method of bringing a common New England farm into a profitable condition, and of managing it well in all its details, and who has recorded it carefully and accurately, has done a service which cannot be too highly estimated. He lays down the rules by which the most healthful and generally profitable business is conducted; by which the most cheerful homes find a substantial foundation; by which true prosperity is most evenly diffused. He presents a picture which all men admire, and which all would be happy to secure for themselves.

The advantages which we enjoy for such record as this, in this day, are very great. The details of farming, when by hand labor alone the fields were tilled, and when strength and industry were the sole requisites for good agriculture, were comparatively simple. But the modern attempts to elevate the standard of agricultural enterprise and to stimulate agricultural intellect, have rendered the business one of more interest, and more careful and profound study. The soil, under the eye of the chemist, becomes something more than a mere inert mass, about which the conjectures of practical farmers constitute the whole fund of information. The fermenting heap of manure which the experienced eye surveys with satisfaction, and the experienced hand manipulates at just the proper moment, has been subjected to scientific investigations, which would explore the hidden treasures of mountains of minerals, and is a topic upon which the most intricate and elaborate disquisitions may be written. The uses of all artificial manures have been presented by the scientific for the experiment of the practical farmer. And the ingenuity of man is exhausting itself in its endeavors to bring the labor of the farm within the grasp of accurately constructed machinery. In this way, farming has become a lesson which the most careful student can hardly master, and for the thorough comprehension of which the doors of schools and colleges are now thrown open. It is under the effect of this new light that the farm becomes so much a matter of renewed interest. And when we find included in one grand whole, the best selection and management of lands, the best mode of stocking, the best construction of buildings, the best use of manures, the best collection of machinery, the best methods of tillage, the most careful and successful application of the most approved forces to the work of a farm, the best exercise of modern intelligence and culture in this work, we have before us an example worthy of imitation, and a chapter on farming which we cannot study with too much care. It is especially important that the agricultural societies should use every exertion to collect and diffuse this information. Premiums on farms, premiums on the best managed manure heap, the economy of its construction, and the greatest amount made with a given number of animals; premiums on the *best collection of agricultural implements actually used one season on a farm;* premiums on the most systematic, intelligible and accurate statement of the business of a farm, should be offered, and farmers should be encouraged to compete for them.

I am aware that some of the information gained in this way may be somewhat crude and inaccurate. But the true value of such information cannot long remain concealed, and it serves as a proof by contrast, much more often than as a means of misleading those who are in search of true knowledge. Neither has it that insidious danger, which attends a false theory presented with all the tempting and bewildering influence of what is called scientific authority.

In discussing the question, how to manage a farm, I have been led on to consider the duties of farmers toward agricultural societies, and the reciprocal obligations of the latter, because, I have always found that associations of this sort have always exerted a good influence on the agriculture of the region in which they are located. There is nothing so contagious as good farming—unless it be bad. The example set by an industrious and skillful farmer is never lost on the community in which he lives. As his own labor radiates from his homestead out over his surrounding acres, so does his example and influence spread over the farms about him. And societies composed of such men, have a wider influence still. They bring together the thoughts and deeds of a larger section. And when we remember how isolated a farmer may be, and often is, how under the confinement of his own business he sees but little of what is going on about him, it will be easy to appreciate the value of any association which will enlarge his sphere of observation, and bring him into closer relations with his neighbors, whether near or remote. And in the desultory remarks which I have made upon farm management, I have endeavored to draw our own attention to the diversity of interests, and the variety of questions which come before us as a Board of Agriculture. We have our part to perform in the work of agricultural education now going on. And we shall only perform that part well, when by diligent collection of facts, and proper arrangement of them, by the encouragement of practical industry, by the diffusion of practical knowledge, we furnish the foundation of good farming to every one who will read, and point to those examples of good husbandry, the following of which will enable every sagacious and diligent land-owner to convert his acres into a well-managed farm.

At the conclusion of the address, His Excellency proposed a vote of thanks to the speaker for his very able and interesting address, which passed unanimously.

The first question for discussion was then announced as "Agricultural Education," and on motion of Dr. Loring, Governor Andrew was invited to give the Board his views on the establishment of an agricultural college, and the course of study to be pursued.

Gov. Andrew.—I do not think I have any views to give upon the subject of an agricultural college, which would be quite appropriate at this moment. Those which I most sincerely entertain have been given officially, heretofore, and have been pretty well understood by the people of the Commonwealth who take an interest in the subject, and who care to know what they are. I do not think that the views which I entertain upon the subject of an agricultural college are those which, at this moment, are quite popular in the Commonwealth among the farmers. My own views, I think, were substantially overruled by the action of the legislature, and I do not care to say anything with a view to interfere with, or to question, or to criticise —not even to criticise in a friendly spirit—the tendency which the management of the subject takes, under the direction which has been given to it by the legislation of the Commonwealth. I think it better that those things which are undertaken, and which are settled, should have an opportunity to be fairly tried. I believe in the fair trial of any experiment which it has been once agreed shall be attempted; and I think it is well to have every question closed, at any rate, for the purpose of experiment, at some time; and therefore I do not believe that any views peculiar to myself would be advantageous to be presented at this moment. I certainly, on this and all other occasions, feel entire freedom to express a sincere and very earnest interest in the subject itself, regarded in any of its relations.

The subject of agricultural education,—by which I mean, when I speak of it in connection with a college, not merely instruction in farming, regarded as a trade,—not merely what I may call the technical instruction of the practical farmer, but something a great deal more than that; because instruction in the technicalities of farming, regarded as a trade, may be obtained in every town in the Commonwealth, on the good farms and from the good farmers. But I believe that all farming will depreciate and run to seed, just exactly as I believe that mechanics and manufactures, and all those pursuits which are more commonly regarded as the learned pursuits and professions would run down and utterly depreciate unless there was a standard higher than that which is observed and cultivated by those who, for convenience' sake, we will call the practical men; and all practical men, so called, are in danger of committing this error, of regarding the standard of the practical man as the standard of ideal excellence. My notion is, that an institution, grand and generous, intended to be lasting, both in its own history and in its bearings and ultimate effect, should have in itself the capacity of presenting an ideal standard, not merely a practical one. If it does not present something a great deal better and higher than the best farmer in Massachusetts can realize and actualize in his annual experimentation on his own farm, it then falls far below its own proper standard.

Now, the university or college where young men are taught in those studies which are preliminary to those in which they engage with a view to the procurement of a particular profession, must have a staff of professors, it must have a laboratory, it must have a library, it must have those means and appliances of teaching and culture which are very far beyond those possessed by any one of the individual gentlemen who are its patrons and supporters, and very far beyond those which will be the private possession of any of its best pupils afterwards, or else it will fall very far below the proper standard of such an institution. Unless a theological school possess a library more extended, more various, more rich and fertile than the private library of the country clergyman, or of the most favored and wealthy clergyman of the community, it will turn out very poorly instructed men in the domain of theological science and learning. Unless the law school possesses much more ample resources in respect of the particular branches of study which it is necessary a young man should be taught, than are possessed by the mass, or even by the most favored individuals of the profession in Massachusetts, you will have but a very inadequate representative of what the poorest and humblest lawyer would regard as an adequate and appropriate law school of Massachusetts. So, too, if you please, take the apothecary, or the most learned, skilful, studious, and scientific physician, engineer, mechanician, or cultivator of any of the specific branches of applied science in the community,—any such person, having any proper sense of the dignity of his own calling, feels the necessity for the existence, somewhere, of a fountain to which he may resort, and to which his children may be sent, for instruction, for books, for machinery, for all the appliances and means of the laboratory; and unless some such thing exist, somewhere in the community, he knows that his own art, his own science, even in its application to the practical affairs of life, must run down.

Now, it seems to me, that the time has come when the agriculturists of a State as full of all the resources of learning as Massachusetts is, as full of wealth, as full of intelligent, scientific, and practical farmers as Massachusetts is, with so high an ideal standard as the people of Massachusetts possess of all sorts of excellence in theoretical and practical affairs both,—I think the time has come when the agriculturists of Massachusetts have a right themselves to be represented, and their posterity hereafter to be benefited, by an institution which shall be to agriculture, regarded as an applied science, or as one of the means of the application of science (for that would be truer,) what the higher institutions of science and learning are to the learned professions, more specifically so called. Everybody knows, who has observed the matter at all, how far farming, even in the best communities, lags behind almost all the other arts and professions of our refined civilization. Farmers themselves have a great tendency to regard their calling not in any sense as a profession, but only as a trade, and to regard it as one to be learned, not scientifically, but empirically. Now, that is the greatest and most utter nonsense in the world; for the wealth, comfort, refinement, and civilization which mankind enjoys rest at last upon that solid basis of the land; and they are all supported and nurtured (not merely human life, but all its arts and all its refinements,) at the last, from the cultivated soil; and just in proportion as you can elevate agriculture itself, will you finally elevate, I think, the people of any country. But agriculture is not to be elevated in the way you lift a rock, by prying it mechanically; it must be elevated just as the human soul itself aspires and soars towards heaven—by the inspiration of light and immortal truth; by the inspiration of that truth which enlightens and lifts up the individual mind and soul and permeates and so lifts up the whole community.

I feel the utmost diffidence in attempting to speak at all upon a subject of which I am conscious I have only the slightest possible glimpse. I am no farmer; I have not the means to be a farmer; I have not the time to be one; I have none of the opportunities for that sort of enjoyment or culture which are given to many of the gentlemen who are here before me; and therefore I can only lisp what I may call the struggling aspirations of a soul which feels a certain sympathy with a great object, a grand purpose; which is grand when considered in connection with our patriotic as well as our economical duties and interests as citizens and as men; and I feel that in so doing, I only commend to other men a line of thought which they can pursue with a degree of profit and instruction to which I can hope in no measure to aspire. And if by these few remarks thus unexpectedly made, I shall have opened the way to a discussion, I shall be more than thankful for having had the opportunity to make them.

C. L. Flint.—It so happens that I have given my views on this subject at very considerable length in the last Annual Report, which has been placed, probably, in the hands of almost every person present; so that my general views in regard to the subject of agricultural education in Massachusetts are pretty well known. But perhaps it may be well to state, very briefly, what has already been done by the trustees of the Agricultural College,—for that is a subject which I suppose this question was intended to embrace.

It is well known, probably, to most persons here present, that the national government made a grant, two years ago, of public land scrip to each of the loyal States, in the proportion of 30,000 acres for each representative and senator in Congress, for the purpose of establishing agricultural colleges in the several States. That gave Massachusetts 360,000 acres of the public land. By the terms of the Act, one-tenth only of that grant could be used for the purchase of land for an agricultural college in each State. That took out 36,000 acres of the scrip. The legislature in its wisdom saw fit to grant three-tenths of the remainder to be spent under the direction of the Massachusetts Institute of Technology. That is an institute which has been incorporated in Boston, and which is starting forth under very favorable circumstances, designed to teach the application of science to all the mechanical arts; and it will teach this in the most thorough and efficient manner, with large means, ample resources, and the highest scientific talent in the country. The legislature took the view, that as instruction in the mechanic arts was the special province of the institute, that part of the Act which contemplated instruction in the mechanic arts, (for that was contemplated as well as agriculture,) could be better carried out by that institute than by an agricultural college, and therefore provided that three-tenths of the land scrip should be applied under the direction and supervision of that institute. That left 216,000 acres to be sold, and the proceeds invested as a permanent fund, the income alone of which is to be used for the support of an agricultural college. The legislature at the same time appointed a board of trustees for this Agricultural College, merely as agents to carry out the general policy which had been adopted by the Commonwealth.

Another condition was, that in the selection of a site for this Agricultural College, the trustees should either raise themselves the sum of $75,000, or the town where the location should be fixed should raise that amount, to be applied to the erection of suitable buildings; so that, in the selection of a location, the trustees were limited to those towns which complied with this condition, otherwise, they would have had to go forward and raise the $75,000 themselves. It will be seen, therefore, that the trustees were not at liberty to go into any part of the Commonwealth and locate this institution where in their best judgment it would seem to be for the best interests of the institution and of the Commonwealth that it should be located, but they were practically limited to those locations which should offer to raise $75,000—a sum not easy to be raised in many sections of the State. One individual in the town of Lexington offered, with great liberality, $50,000, in cash, on condition that the town should raise the other $25,000, and the trustees were assured that that amount would be raised. Then the town of Springfield assured the trustees, by their representatives, that if they saw fit to locate the College there, the money would be raised; and the same pledge was made for Northampton and Amherst. There were, then, four competitors for that location. The trustees had fixed in their minds, in the main, what they desired in connection with the location of the College. They found, on examination, that the land which was offered to them in Lexington was mainly adapted to a grass farm, the gentleman owning it having spent more than a thousand dollars an acre on much of the land in clearing it of rocks, and in other general improvements. It was not, therefore, so well adapted to the general purposes of experiment and cultivation as the trustees thought the farm connected with an agricultural college ought to be. The places offered them in Springfield were not what the trustees thought desirable ; the farms offered in Northampton were not fully satisfactory ; and they came to the conclusion, after considerable examination and deliberation, that so far as the farm was concerned, that in Amherst was on the whole better adapted for the purposes of such an institution than the farms offered in either of the other towns, so that they felt bound, on the whole, to locate the institution, so far as their power and choice should go, in the town of Amherst. The town of Amherst assured the trustees that the $75,000 would be raised, and it has been raised.

I make this general statement in regard to the subject in order that those present who may not be familiar with the course which the matter has taken may understand the position in which the trustees of the Agricultural College were placed. They were actually limited to these four locations, and they were obliged to select the one which, in their judgment, appeared to be the best of the four. It is not necessary to say, that if there had been a wider range of choice, the result might have been very different.

I will state in addition,—although I suppose the matter to be now so far closed that it cannot lead to any practical result—the plan which it was thought by some would, on the whole, be for the best interests of the State. It is well known to those present that there was a large farm, known as the Bussey estate, in West Roxbury, left to Harvard College, half of the fund left with it to be devoted to the establishment of an agricultural college on the farm, one quarter to the Law School, and the remaining quarter to the Divinity School. This farm comprises 300 acres, is beautifully situated, well walled, and furnished with all the desirable improvements for a large and elegant farm. The income from that fund, at the present moment, is from twelve to fifteen thousand dollars a year. The estate is subject only to a single life interest, which could, no doubt, be easily purchased. Now, it was supposed that arrangements could be made with the corporation of Harvard College, by which that farm could be placed under the control of the present board of trustees of the Agricultural College, Harvard College reserving to itself only so much control, by the way of visitation and the appointment of trustees as to comply with the terms of the will. Now, it will be seen that in case the agricultural population of the Commonwealth had the right eventually to decide this question, and if they could see it for their interest to unite the national fund with the fund left by Mr. Bussey, there would be an income of twenty-five or thirty thousand dollars, which might be applied to the support of this agricultural institution almost immediately. I think that nobody will say that an annual fund of twenty-five or thirty thousand dollars would not have made such an institution a success, because that would have secured the highest scientific talent in the world.

But the popular sentiment seemed to be, that the farmer should have an institution by himself; that there should be an Agricultural College established for the express purpose of educating farmers' sons alone; and the general opinion seemed to be that that institution should be isolated, should be devoted, to a large extent, to practical agriculture, and if practical agriculture were to form a large element in it, it would be desirable that it should be located further inland. There are evidently two sides to the question. There are some objections, perhaps, to a location in the immediate neighborhood of a large city, or another collegiate institution. The question before the people was, really, whether the advantages of that large fund, with the farm connected with it, and the incidental advantages of the Institute of Technology and of the institutions in that immediate neighborhood, were not so great as to make it very important that the location should be fixed there. I will not attempt to enter at any length into the discussion of that point, because I suppose the question is now fixed beyond any change, whatever may be the opinion of any one individual in regard to it.

The discussion was continued by E. W. Stebbins, of Deerfield, Levi Stockbridge, of North Hadley, Alured Homer, of Brimfield, Velorous Taft, of Upton, C. O. Perkins, of Becket, and Dr. Geo. B. Loring, of Salem.

Gov. Andrew.—Perhaps I may be permitted to recall to the memory of gentlemen, one important consideration, which lies at the bottom of everything which has been said about the establishment of an Agricultural College, and that is, that no fund whatever has been provided by the legislature of Massachusetts, nor by any of the people, in addition to the 360,000 acres of land scrip, with the exception of the $75,000 which it was provided by the Act of the legislature, incorporating the Agricultural College should be raised by subscription, for the purpose of erecting the buildings. The Act of Congress donating the public lands, in the proportion of 30,000 acres to each member of Congress, senator and representative, for this purpose, provided that no part of the proceeds of the sale thereof, should be used for the purpose of erecting buildings, but one-tenth part of the amount donated to each State might be used for the purchase of land. Before anything could be done, therefore, some provision had to be made for the procurement of buildings. The only provision made by the legislature for this purpose was the one requiring that the sum of $75,000 should be raised by subscription or private donations. That $75,000 could be procured only by making it for the interest of the people of a given town or neighborhood to subscribe towards the establishment of the institution in their own vicinity, it being supposed to be advantageous to have it in the neighborhood of any given people who should subscribe the money necessary for the buildings. There were three or four neighborhoods, therefore, as Mr. Flint has already remarked, who proffered the requisite sum of $75,000. Now, after the procurement of the land, and the erection of the buildings—so far as $75,000 will go towards their erection—there is no fund save the land scrip, three-tenths of which have been given to the Institute of Technology, as the proper proportion belonging to the mechanics and manufacturers, who have an interest in the fund. After taking out, therefore, the one-tenth for the procurement of land, and giving three-tenths to the Institute of Technology, in aid of the cultivation of the sciences and arts in connection with the study of mechanics and practical manufacture, there remains six-tenths of the 360,000 acres as the only fund of the Agricultural College.

Now, I tried, very early, by correspondence with the governors of the other States, to effect an arrangement with all the States by which this land scrip should be reserved, and not thrown upon the market at a less price than a dollar an acre, believing that all the public lands available were worth, and would turn out to be worth, a dollar an acre. You know that $1.25 an acre is the price at which lands that have been surveyed can be acquired; and land warrants representing land which had not been surveyed could be bought, at that time, for about a dollar an acre. I thought that the people of the States, being interested in keeping up the price of the lands to a fair minimum, ought to be willing, at home, in their own States, to purchase the land scrip, giving their State governments, which were made, by Act of Congress, the trustees of this school fund, a fair price like that; then, after individuals or companies had purchased the land scrip they would be free to enter it upon any surveyed lands which were open for entry. The State could not enter; she could only sell the scrip.

No State, under the Act of Congress, can be the holder of any land lying outside of its own borders, and as we have no public land within our borders, we could enter none. The State of Massachusetts could sell its land scrip, and the persons who bought could then enter and occupy the land. I found, however, very little response from the other States, and within a very short time after, the State of New York actually put their land scrip upon the market, and broke down the price at once to eighty cents, and other States began to follow on. Last winter, I talked with various gentlemen whom I knew,—public-spirited men, men of means more or less ample,—and various gentlemen interested in agriculture as practical farmers or otherwise, who I knew possessed more or less available means, urging upon them the importance of creating a working fund for the Agricultural College, and endeavoring to show to them that it would not involve much outlay of money, considering the large number of people and the large amount of means which they controlled who were interested in the subject, if they would take all our scrip at a reasonable price, or at a price a little liberal, and take the chance, if necessary, of a small margin of loss. But there did not appear to be any interest in that particular view of the subject which was intense enough to secure the disposition of the scrip in that way. The governor and council, in pursuance of the authority and duty imposed upon them by the Act of the legislature, fixed upon eighty cents an acre as the minimum price at which this land scrip might be sold, and Judge French was appointed a commissioner, under the Act, and authorized to sell the scrip, subject to the minimum price of eighty cents an acre, under the general supervision of a committee of two members of the council, if I remember right, so that the details of the operation should be always overlooked by some persons connected with the executive government of the Commonwealth. Precisely how much has been sold, I do not recollect; but I think about 80,000 acres, at a price of eighty cents an acre, or perhaps a trifle above.

So, gentlemen, you see that when we are discussing this subject in view of what we would like to have, what we would prefer, what we would advise, we are, perhaps, necessarily, a remote distance off from any substantially practical view which it is possible for the trustees of the Agricultural College to take, in administering the fund of the institution, under the Act of the legislature. It has been the object, I believe, of the trustees, to set the institution in motion as early as they conveniently could do it; still, it can never come to anything at all until the whole or nearly all the land scrip shall have been disposed of; and at the present price of eighty cents an acre, it will only afford a very meagre and beggarly fund from the income of which to maintain an institution which shall be of any sort of credit or usefulness to the Commonwealth; and if any of the trustees were influenced to vote in favor of establishing it in the neighborhood of any other institution of learning, from which they might hope to derive assistance, either by the aid of its library, its laboratory, or the convenient contiguity of its scientific professors, whom they might also employ to lecture, it was probably owing to what they felt to be the exigent necessity of the case, which admitted no alternative. If the people of the Commonwealth who have a living interest, a personal interest, they and their posterity, in such an institution, had undertaken to be liberal in a pecuniary way, as well as liberal in their views concerning the organization and purposes of such an institution, it might then have been put upon a basis entirely independent of any suspicion, even, of a connection with any other institution. But I think that a fund very much larger than is ordinarily supposed to be necessary would be found requisite in order to establish an institution which should be of any great advantage or any credit to the Commonwealth. Had it been thought proper to have taken measures to put the Bussey Institute into operation, and to make that fund available immediately, then the scrip which was given by the United States to the Commonwealth, might have been easily enough withheld from the market until it could bring a price proportionate to its real value ; and in the meantime, the institution might have been set into operation immediately and its fund enlarged by the aggregations from time to time derivable from the proceeds of the sales of the land scrip. That, however, was not the view which met the approbation of the legislature, and, perhaps, not of the people of the Commonwealth, and it has not been undertaken. The Bussey Institute, however, will sometime or other, of necessity, become a living and active institution. As soon as the life shall terminate of the person who holds the life estate in the Bussey family, it will then become the duty of the corporation of Harvard College, either directly, or indirectly through other persons or societies, to incorporate that institution. There will be a farm of some three hundred acres, as Mr. Flint has mentioned, in a very high state of cultivation, with a great many of the means and appliances of elegant as well as useful, valuable and productive farming, the proceeds of which will form a fund out of which the lecturers, professors, and other expenses of an institution of learning can be maintained. In the meantime, nothing having been done by that institution, there is at present no practical work of that sort open to the farmers of the Commonwealth, as far as I know, except to do their best to render efficient the institution which is now called the Agricultural College of Massachusetts.

EVENING SESSION.—The Board met according to adjournment, and LEANDER WETHERELL, Esq., of Boston, delivered a valuable lecture on Agricultural Botany, which was listened to with great attention by a large and intelligent audience.

On motion of Dr. LORING, the thanks of the Board were presented to Mr. Wetherell for his interesting lecture, and the meeting adjourned to Wednesday morning, at 10 o'clock.

SECOND DAY.

WEDNESDAY, Dec. 14.

MORNING SESSION.—The Board met at ten o'clock. In the absence of the president, Dr. LORING was appointed chairman.

On motion of Mr. Perkins, a committee of three was appointed to consider the subject of the Agricultural College, and report to-morrow morning, at ten o'clock. The chair announced as that committee, Messrs. Perkins, Huntington, and Grout.

THE CORN CROP.

The first subject announced for discussion was the corn crop, and Dr. Hartwell, of Southbridge, was called upon to open the discussion.

Dr. HARTWELL.—I am entirely unprepared to make a speech upon the subject, but I have some facts in relation to the manner of planting corn, the preparation of the soil, and taking care of the crop.

No man can obtain a profitable crop of corn unless his soil is well enriched. It is in vain to plant corn upon poor soil. The old method of planting corn was to spread the manure, perhaps to the extent of twenty cartloads to the acre, over a large surface, and the farmer would usually obtain from twenty-five to thirty bushels to the acre. The expense of ploughing and cultivating an acre of corn, aside from putting on the manure, with the price of labor at a dollar a day, would be $15. The twenty loads of manure were worth to the farmer about $20. There was an outlay of $35; so that the decision of the farmer was, that there was no profit in raising corn. But if you will put on forty loads to the acre, and take good care of the corn, you may produce from sixty to seventy-five bushels an acre.

The cost of ploughing and cultivating will then be $15 an acre; for it is no more work to cultivate an acre for seventy-five bushels, than it is for twenty-five, and the cost of your manure $40. I should charge one-half the manure to the corn, and the other half to the succeeding crop, making the cost of your crop, $35; and if you have a crop of seventy bushels, at $1 a bushel, you have then a profit of $35 on that acre. The fodder will pay, as a general thing, the expense of taking care of the crop, after the last hoeing. The high-farming system there shows a profit, and it is the only system which will pay with the corn crop. If you cannot go into the high-farming system, you had better abandon the crop.

I have said that there should be forty loads of manure to the acre. If you have but forty loads, put it all on one acre, not on two; because the crop will not be much less at any rate, from one acre than from two, and you add $15 to the expense of raising it, if you cultivate two acres instead of one.

In regard to the manner of planting, I will say that the distance I have settled upon is three and a half feet each way. I think there should be, for every stalk of corn, at least three square feet. The poorest crop of corn I ever raised was planted with the hills less than three feet apart. It was well manured. It was the best-looking corn that I ever saw in the month of June, but it was so near together that it shaded the ground. The stalks were very thick, but the ears were very short.

I have been told that in Virginia they only put one kernel into a hill, and make the hills six or eight feet apart, and that a larger crop is secured with only a single kernel in a hill than with more. I usually put five kernels in a hill, as some of the seed will not germinate, and the worms will destroy some. At the distance of three and one-half feet, if three stalks are left, it is sufficient. I can then cultivate my corn with the cultivator, and do it with animal power, which is always cheaper than hand labor. The cultivator can be run within six inches of the hill, each way, and then there will be one foot to each hill for hand hoeing. In putting the kernels into the hill it has been my practice to put them as near together as possible. Farmers were formerly in the habit of taking pains to spread the kernels as much as possible in the hill; I find they grow better by being combined. There are several advantages in that combination. One is, it is much easier to cultivate the ground. The weeds do not come up among the corn, and you are not obliged to use your fingers in eradicating them.

Another advantage is, that in hoeing, you can bring the earth up around all the stalks, without any trouble at all. Then they endure the winds much better; they will stand stronger against the blast than if they stood at a distance from each other. I never have observed a stray stalk of corn in a field that produced a good ear. I consider that corn is a family plant, and that it will grow better in hills than in drills. Then again, in harvesting, the stalks come more directly within reach of the hand when growing compactly than when scattered over the hill.

The cheapest way of harvesting is to cut up the corn and stack it whenever it is sufficiently ripe to avoid the danger of heating in the stack. Another advantage in cutting it up is to save it from the early frosts. If you have a frost by the 20th of September, if your corn is not pretty well ripened, it will be injured; if it is in stacks, you are very sure to save your crop. The only objection to that way of harvesting is the extra labor of husking, but that is very little. Your corn is then put up in bundles, and is ready for the pitchfork, and to be packed away in any part of your barn.

As to the value of corn fodder, I am not very sure about it. I think, as a general thing, it has been overrated; but I believe the fodder from an acre of corn that will produce fifty bushels is worth quite as much as a ton of English hay, and that will pay the expense of cutting, carrying to the barn, and packing away.

With regard to the value of the corn crop, compared with other products of the farm for feeding, it has been usually estimated that fifty pounds of corn are worth one hundred pounds of the best English hay; but some farmers I have known have had a disposition to abandon corn and go into barley, thinking that they would save labor and get about as much profit as they could from corn. I think they will abandon that idea. I think the corn crop one of the best crops in New England; we know it is the great crop of the nation, and I think that any New England farmer who abandons that crop will be in a situation to impoverish his land.

Rev. Mr. Dean.—Do you use phosphate, ashes, or plaster?

Dr. Hartwell.—No, sir, I have only used stable manure, and that upon the surface, for the reason that I have had plenty of manure for my land, and have not, therefore, used any of the stimulating manures. For a great many years I have put no manure in the hills. If the land is warm and well manured at the rate of forty loads to the acre, it will need none. The reason I have not put any manure in the hills is on account of the expense and labor of doing it. It would be no injury to the crop, and it might forward it in the month of June. But if your land is warm there is no danger that the crop will not come forward in season.

Rev. Mr. Dean.—Do you raise pumpkins or flat English turnips with your corn?

Dr. Hartwell.—No, sir, I have planted pumpkins, but I would as lief have weeds. I don't believe in putting any other crop with the corn. I plough my land in the fall, smooth over the surface, and then apply my manure; and I usually work it in deep with a horse-plough. I spread the manure from the cart, and do not tip it up in heaps, because it is impossible to spread it evenly in that way. A load of manure is sufficient to spread over four square yards. Measure off that distance, set down stakes, and let your man spread his load over that space, and you will hit it. I have tried spreading the manure on the ground in the fall and leaving it until spring, but I would not, as a general thing, advise it. If you put it on a westerly declivity it will blow away; but if you have a piece of land that is protected by woods or that has an eastern or south-eastern declivity, there is no harm in putting on your manure in the fall. There was a premium offered by our society for the best acre of corn. I measured off one acre and weighed the crop after it was husked, and it averaged eighty pounds to the bushel in the cob, and the acre produced a fraction over one hundred bushels, for which they gave me the premium, $18.

Hollis Tidd, of New Braintree.—Was your land green-sward or old soil?

Dr. Hartwell.—This last year it was green-sward that had been mowed for some four years. It was turned over, thoroughly smoothed down, and the manure spread over it. To do this it is necessary to keep a stock of manure one year ahead. I think manure grows better by keeping. I think it is better to plough in the fall than in the spring.

Mr. Perkins.—What time in the fall do you prefer to plough? Does it make any difference whether it is the first of September or the latter part of November?

Dr. Hartwell.—I think September is the best; but farmers must do as they can. They cannot always do the work of the farm at the time they ought to. If I had my choice I should do it in September, but October or November will answer the purpose.

E. W. Bull, of Concord.—One of the most successful farmers in Concord, who grows the largest crop of corn to the acre of any man in town, but whose soil is rather low and moist, lets the grass grow until very nearly the first of June; certainly until the season is warm and the grass has grown considerably. He hauls on not less than fifty loads to the acre, which is partly fermented, but not wholly, and ploughs it under immediately with a plough which gives a furrow of about eight inches. He harrows the surface over thoroughly and plants the corn with a little ripe compost in the hill to start its roots quickly. The season is warm, the ground is warm, the manure is warm, and the ground is soon covered with so many stalks that I think the doctor would say he would have no crop, and yet he counts positively and confidently upon fifty or sixty bushels, and is not disappointed, and his following crops are all so much the better for it. If the corn crop did not pay, in a money sense, still it is a most important fallow crop; and since we must have a fallow crop, I think it is particularly fortunate that we have one that gives us breadstuffs. The English farmer must fallow with the turnip, but we have a fallow crop that gives us sometimes fifty bushels to the acre.

Harrison Garfield, of Lee.—If I wanted to raise an extraordinary crop of corn for one year, I should certainly pursue the same method that the doctor does; but it is a question in my mind whether manure put on in that way will serve the best interests of the farmer in a succession of years. My experience has been that it is best not to leave the manure exposed to the rains and to evaporation any longer than is necessary. I have practised putting it on in the spring so that I could retain the fertilizing property of the manure, not only for the crop I put in at present, but for future crops. I should be glad to have gentlemen here, who have had a larger experience than I have, express their views in relation to that point.

Dr. Hartwell.—I can state one fact that will perhaps throw some light upon the question. Several years ago I ploughed an acre and a half in the fall in the manner I have described; I proposed to make a nursery upon half of it, and I put on the manure and spread it upon the surface of the soil, but the frosts followed so soon that I was not able to work it in. I changed my mind in relation to planting a nursery, and in the spring I spread an equal quantity of manure over the remainder of the land, and planted it all with corn. Where the manure was put on in the fall the corn was a great deal the best. I could see it in the rows, contrary to my expectation, for I expected that I had lost something on the manure. The next year the land was sowed with oats, and I could see the line where that manure came that I put on in the fall. Next year it was sown to grass, and that line was seen three years afterwards. I am not sure that there were not circumstances connected with it that I was not aware of, but that was the fact as it showed itself to my observation at the time. I tried it one year afterwards, but it was on a piece of land over which a great deal of water passed, and I lost some portion of the manure by the wash. For that reason I abandoned it; and, as I told you, for general use I would not recommend it. It is only under peculiar circumstances, where your soil is protected from winds and washes that it will answer to leave the manure upon the surface.

Rev. Mr. Dean.—I suppose, in discussing the question of the corn crop, it is necessary not only to look at the immediate results, but at the general results to the farm. In Orange County, New York, where I was brought up, they used to put on the manure in the spring; but the most successful farmers argue of late that corn is a very exhausting crop, and that there is a difficulty after the rotation is complete, the grass running out in a little while; so that I find now that the most successful farmers do not put on all their manure with the corn; they manure to get rather below a fair crop than otherwise, and reserve a large part of their manure to put on when they put in their wheat, and then they get a very fine field of grass, and manure for the next rotation of corn, oats, &c. They manure with the clover. I should like to know whether Massachusetts farmers have any experience in that direction.

Dr. Hartwell.—So far as I know, they have not. They have experience in putting manure on grass lands, and many of them like the process. But with regard to the system I have spoken of, the farmers are not in a situation to practise it. There are no farmers in our section that I know of who have retained a year's stock of manure. They would be under the necessity of losing one year's crop of corn to get into the system. For that reason they usually put on in the spring the manure that has been made during the winter. But I certainly would recommend to every farmer who raises corn, to have one year's stock of manure on hand, if he can possibly get into that situation.

Professor AGASSIZ.—I have no opinion to express concerning the mode of applying manure, but I would suggest some experiments which may be beneficial in settling the question I have heard discussed. The object of manuring the land is no doubt to furnish food to the plants. Now I would like to know what is the extent of the rootlets which grow from a stalk of corn—how deep do they go and how widely do they spread? If your manure is to be beneficial at all it must penetrate to the extent to which the rootlets of the plant extend, and at the time those rootlets are most active. Therefore experiments ought to be made by which to ascertain how deep the effect of the manure is felt in the land after a certain time from the period when it is put on the surface. Unless you know that, you are all the time working in the dark; and I am not aware, from the observations I have heard here, that it is positively known to the growers of corn in how much time the roots grow to such a depth, and such a depth, from each stalk, and how far, deeper and wider they extend in successive weeks or months, and how far the manure follows that growth, so as to furnish at every stage the proper nourishment to the corn. That, I believe, is one of the most interesting desiderata to the agriculturist,—to ascertain at what rate and what extent the manure is carried down into the ground. We ought to know that for every crop.

Dr. HARTWELL.—I wish to say, in reply to the question of Professor Agassiz, that I know they spread over every inch of the soil; with regard to the depth I am not able to say. With regard to manuring upon the surface I will mention one fact. Two years ago I left a large heap of manure upon the surface of a lot before I ploughed it. It lay there about one year. When I spread this manure upon the land, knowing that where the heap lay the earth would be so highly charged with salts that it would be difficult to get a crop, I ordered my man to take off four inches of the surface and spread it over the rest of the field. That was a year ago this fall, for last year's crop. I planted the field with corn. Where this heap had stood the corn looked burnt, and when the dry time came on, the surface of that ground, four inches below where the manure lay, was covered with nitre. You will find that it will permeate the soil for as much as eight or ten inches. The soil seems to have a wonderful affinity for the salts of manure. You will find that water from a manure heap, running over a ploughed field, will lose all its coloring in running a few rods, and be perfectly white. Nature always manures upon the surface. It is a question whether the benefit of manure will not always be as great placed upon the surface as in any other position. I have seen manure spread upon a gravelly knoll in a pasture, and left upon the surface of the land, and the result was most excellent.

Mr. Grout.—I rise for the purpose of putting an inquiry in regard to the basis we are working upon. We are treating of soils for the production of corn. To get that corn we are obliged, here in New England, to use manures; and the application of manures is of course a very important item in the case, and, in connection with it, the kind of manures to be used on different soils. I should be glad to hear from Dr. Hartwell and Mr. Bull the character of the soil in the cases to which they referred. Professor Agassiz suggests a question in regard to the depth to which the roots of corn penetrate. I have examined that matter myself, and I have found the roots about two inches under the surface. They do not run to a very great depth. They need the heat of the sun, and sometimes the moisture of the dews will affect the roots of the corn. They perfectly permeate the whole surface; they reach into every particle of manure that is applied there. I once, in cultivating some potatoes, found that the roots ran nearly across the row. Thinking it would injure the crop to hoe them, I left three or four rows to see what the effect would be, and I don't think I had half as many in those rows as where I hoed.

Now, the application of manure, unless we know the kinds of soil as well as the season in which it is to be applied, is like prescribing the same kind of medicine for all sorts of diseases. We cannot safely calculate upon the effect. I think we ought to understand the character and composition of the soil, and what kind of manure is required for different soils. Unless we know this, we cannot tell whether forty loads to the acre will produce sixty bushels of corn, or more or less; or whether twenty loads will not produce fifty or sixty bushels to the acre. I have put on twenty-five loads to the acre, and have got over seventy bushels; and I have applied more than that sometimes, and have not got near so much as that—say forty bushels to the acre. Now, there is a difference in seasons about that, and there may be a difference in manures that we don't know about, as well as a difference in the soil. I think all these fundamental facts should be studied, that we may have more basis to go upon.

Prof. AGASSIZ.—The observations which have just been made show that we are in ignorance of one fact which is of the utmost importance—the depth to which rootlets grow and from which they receive nourishment. I was quite astonished to hear the gentleman's statement that they go down only two or three inches. I believe they go down several feet. Now, how is that fact to be ascertained? It is not an easy matter. It cannot be ascertained by tearing the corn from the ground. The only way is to wash the earth away with water, using no violence whatever. If that be done, I think it will be found that the network of rootlets, which is attached to every plant of corn, has a most extensive system of ramifications; and to what extent that goes, and what the plant can receive from these different rootlets, are essential elements in the consideration of this question.

Remarks have been made concerning manuring at the surface as being nature's mode of manuring. No doubt it is; but let us see to what depth this manure is carried in the course of years. Nature is every year manuring the land, by the fall of the leaf and the decay of the plants growing at the surface; but that manure, once at the surface, is all the time sinking down. Every new layer brings the preceding lower and lower down and we ought to know positively to what depth all that is carried. I have looked for that information wherever I could, and I don't think we have any information of that kind. It would be well if we began to collect it systematically, and every contribution in that direction, will, no doubt, be a benefit to agriculture.

The subject was then laid upon the table, and the next topic for consideration was a lecture on

GRAPE CULTURE, BY E. W. BULL, OF CONCORD.

I shall give a familiar talk upon grape culture, and try to show that it may be successfully introduced into New England, and counted upon as a constant and sure crop as confidently, and even more confidently than your apple crop. Careful inquiries instituted by Colonel Wilder, some years since, showed that the value of the fruit crop of Massachusetts was not less than two millions of dollars. Yet our fruit crop is rather uncertain. Pears only succeed constantly in sheltered locations and in a soil properly adapted to them. Apples, even, are failing, as our apple growers complain, constantly, more and more every year. From the ravages of insects, the vicissitudes of the seasons, and, possibly, as a committee of this Board thought they found, some years since, from neglect of the proper modes of culture—from imperfect manipulations in the nursery—in short, from various causes, the apple seems to be less certain than formerly, and our fruit crop less certain as a matter of income; and if it ceases to be profitable, it must be given up. A friend of mine, whom I have known for years, who has four acres of as handsome apple trees as you can find in Massachusetts, told me the other day, that after fourteen years of cultivation, during the whole of which time they have been of bearing size, and have borne occasionally, he is about to cut them down, because they do not, on the whole, cover the actual expense of cultivation; and he comes to me to see whether the grape cannot be grown there, and whether, if so, it will pay.

The grape is, perhaps, the most ancient fruit known to man. In periods of the most remote antiquity, ever since there has been any historic record of fruit, there has been a record of grape culture; and in all ages, it has been considered the type of human felicity to sit under the grape in peace and security. There would not be, I think, this uniform testimony to the early and continued cultivation of the grape, on the part of all writers, in all ages, had it not been considered, in all times, the best fruit grown—and that is my opinion. I am, perhaps, something of an enthusiast in the culture of the grape. I speak to you of it out of my experience of more than twenty-five years. If I speak in the first person singular so often as to lay myself open to the charge of egotism, I beg you will consider that I do it, not because I do not know it lays me open to that charge, but to avoid too much circumlocution, and to save time, of which, I have no doubt, I shall consume too much.

I said that grape culture is possible in Massachusetts. I do not mean by that, that all grapes can be grown here; but I do mean, that grapes have always been here since the first white man set his foot upon the soil of Massachusetts, when he found the grape so abundant that he christened the country, "Vineland." We had, then, only to get out of this native stock, which was adapted to our climate, and perfectly hardy, a seedling of good quality; we had only to break it of its old habits, in short, to make it edible, to attain the object we had in view. I do not doubt that this idea occurred to many before I took it up. The intelligent horticulturist saw it would be the work of a lifetime, and we are a people impatient of delays; we want our results swiftly; and, therefore, although they saw it to be possible, and might recommend it to others, they forbore to proceed themselves with a course of breeding which involved the work of a lifetime, and perhaps more. In my own case, after having grown grapes of all kinds in my garden in Boston, with great success, I found myself unable to grow them on a sunny slope where I felt sure I could do so. What was I to do? I loved the grape, and must have it. I might go to Pennsylvania and grow grapes, but I could not take Massachusetts with me, and I wanted Massachusetts, and I wanted the grape too. So I set about raising seedlings from this native stock, and in the second generation, I got a good grape; and from that grape I have seedlings still better; and from them again, I have seedlings growing; and I think I have established the fact that the time will come when out of these successive reproductions, you will have grapes as good as you desire,—grapes as good, perhaps, as those of any part of the world,—hardy, perfectly adapted to our climate, and which may be grown in field culture, as you grow any other crop; for I have found the grape more certain and more constant than any other fruit crop, not excepting even the hardy currant of the garden. For twelve years, I have had the grape ripen its crop perfectly every successive year. Four years ago, on the last day of September, we had the thermometer at twenty degrees, freezing all the young wood, and all the buds which were immature, but still, under these most unfavorable circumstances, which had not occurred for thirty-six years before, I had a remunerating crop of grapes.

But although the hardy grapes may be grown here without difficulty, still, they prefer certain kinds of soil, they need certain aspects, and certain conditions of growth, without which they will not come to perfection, without which they will not be of good quality. And let me say, in passing, that this accounts, probably, for the diverse opinions in regard to our new grapes, which are planted every year by various horticulturists, and cultivated with equal skill, as far as cultivation goes, but in regard to which the conditions necessary to the successful culture of the grape have not, in all cases, been present; so that in one instance, where these conditions are present, the grape comes up to its type, and in the other falls behind it, as to time of ripening, and of course, as to quality. The soil should be light and warm, so that the tender roots of the grape may permeate it easily. It does not seem to be necessary in my experience—although it runs counter to my former belief, and although it runs contrary to all the instructions of the books—that the soil should be rich. We are told to trench the ground and enrich it abundantly, and that nitrogenous and concentrated manures are necessary and best for the grape. It is within my knowledge, that a certain eminent grape-grower trenched his soil thirty inches, and put upon an acre of land no less than a thousand loads of manure. I think the size of the load was not stated, but a thousand, even of the smallest loads, would be an excessive quantity. On that soil, Delawares were grown six feet in length in a season, from one year vines. This seems to run counter to my experience, that grapes do not need a rich soil; but I speak of the hardy grapes that we have here. The Delaware is a slow-growing grape. It has been traced to the garden of Mr. Prevost, in Philadelphia, a gentleman who grew foreign grapes; and many German cultivators believe it to be a seedling of the Traminer, a German grape, growing there. It requires high feeding; it grows slowly; it is a child of another country, and requires more nourishment and feeding than our own more robust progeny. This is true of the foreign grape generally. If you undertake to grow it here, you must enrich the ground very much, so as to make some sort of compensation for the long season which it had in its own country of five months, as compared with our shorter season of less than four. A light corn soil, enriched as if for corn—that is to say, forty loads to the acre, (more or less,) compost, such as a farmer would give to it for corn, to promote the formation of the roots of the young plant, and establish it—I have found to be the best. After that, no barnyard manures are required, only mineral manures. Indeed, I have given up, from the necessity of the case, in the light of my long experience, the use of barnyard manures, and give only potashes, which are indispensable, in the form of wood ashes, and sulphur, which I have found to be also indispensable to the perfect health of the grape. It is a sort of medicine for all those diseases incident to the grape, growing out of bad substances in the soil, or growing out of atmospheric influences or any other. I apply it in the form of gypsum, which is nearly one-half sulphur. Phosphate of lime is also indispensable. This promotes the formation of roots more than any other manure, except thoroughly decomposed cow manure, which is in some sort a substitute for bone dust, containing as it does, considerable phosphate of lime, and promoting the formation of roots, as it does, certainly in the same way and to the same extent that the phosphate of lime does.

Let me say that the quantity of manure I should apply to the acre, after the vines get to bearing, would be twenty bushels of wood ashes, twenty bushels of fine bone dust, and five bushels of plaster of Paris—gypsum—sown broadcast, and worked in lightly. Once in three years, that application will be sufficient for any vineyard which is thrifty and of hardy grapes, or for any vineyard well established, to keep it up to a full crop, and to make as much wood as a grape-vine ought to make; which wood will be solid and strong, and consequently hardy, and capable of enduring our winters.

Although the soil should be perfectly adapted to the grape, you still want a good aspect. A south aspect is by universal consent the best. The grape is a child of the sun, and it wants heat—heat at the root and heat at the top. I have seen the thermometer at one hundred and four degrees, and the soil at one hundred and thirty degrees, when the thermometer was inserted in the sandy loam, but I have never yet seen a day so hot that it curled a leaf of the grape or seemed to have the slightest pernicious effect upon it; on the contrary, it seemed to enjoy it. I have never seen a day so hot that the grape did not seem to thrive all the better for that heat. All cannot have a south aspect, however; and the next best aspect would be, in my experience, south-west; next, south-east; next, west; and, lastly, east. This runs counter to the teaching of the books, and to the opinions of many horticulturists. When some eminent grape-growers came to my house, and saw a grape growing in a west aspect, they said they wondered it throve there at all; but I invited their attention to another vine, of the same age, growing on the east side, and that on the west side, although the characteristics of the soil were less favorable, was much the best. And it seems to me there is a good reason for this. In the autumn, when the atmosphere cools in the night, the afternoon sun lies on the west side until the last moment, and that afternoon sun is of great service in carrying the grape through the night, without interrupting the flow of its juices. Climate is somewhat within your control, in this matter of aspect. A south aspect, with surrounding woods, will so modify an otherwise rugged and severe climate as to be equal to a degree or two of latitude; for although the grape does not need the protection of the woods against the winter winds, it does need all the heat it can get, as I said before; and a vineyard planted near woods, which intercept the rapid currents of air which carry away the heat, you can see would be a great deal warmer than if lying in an open space. So that climate may be modified by patches of trees, and the grapes have a protection equal to covering up in winter, or to a degree or two of latitude; and many grapes which are not hardy enough for field culture, but of excellent quality, may be grown there with success, and so we may increase the variety of grapes we grow, and have some grapes, with that degree of protection, which otherwise we could not have. Protection, although by some of our grape-growers believed to be indispensable, even to our hardy grape, implies so much labor and expense, and at a time when every farmer is so busy that he will be pretty sure to neglect it, or not be able to give it to the vines, would be such a drawback to the field culture of the grape, that it would, probably, never prevail largely in Massachusetts, where labor is so costly. I know that in Europe, in some districts, near the north line of grape culture, they do take down and protect their vines in winter. But labor is cheap, the grape interest is the ruling interest, the most profitable interest, and they think they can afford to do it, and they do do it; but our people, I think, would not. Now, in my judgment, protection is never needed where a hardy grape is used, and where it is properly cultivated, in which case its wood will be ripe and solid and capable of enduring the winter better than in the other case.

And what is proper cultivation? Simply that the vine shall be kept in perfect health, and not pushed so fast with stimulating manures that the tissues of the wood will be loose, spongy, and in short, unripe. I have seen the shoots of an oak tree, which stopped growing in the spring, from drought, but started again in August, with the late rains, and grew long, killed by the severe winter frosts, showing that even the hardiest of plants must have its wood well ripened to endure the winter. Some grapes which are believed to be tender are positively hardy when grown in this way; but almost everybody grows the grape with so much stimulating manure that the wood is not thoroughly ripe and hard, and so those which are by nature a little tender, die utterly, and even those which are hardy, with proper culture, lose some of their wood. You can see, I think, that with this method of cultivation which I have suggested, the grape would not be likely to make too much wood. If it made no more than half a yard, or twelve inches of wood—thoroughly well ripened wood—with well developed buds, you might be content. But you would find, in growing the grape, or anything, indeed, that the rule for pruning would lie in this: that if you have great power at the root, you must have a corresponding extension of top. There must be a proper balance between the root and the top. If there be too much top, the growth will be meagre, and the crop meagre. The remedy would be, of course, to cut back severely. But if, on the other hand, your grape was growing with such luxuriance as to get out of hand and crowd the trellis where you did not want it, and you kept cutting it back severely, the difficulty would only be continued from year to year, and you would have wood, not fruit. So it happens that some of the most prolific vines we have, do not, under some circumstances, bear; but on inquiring, you will usually find that they have grown with such vigor, they have made such an enormous quantity of wood, that the formation of fruit buds was impossible.

But I did not mean to speak of pruning immediately. I was speaking of planting, a subject on which, it seems to me, to be important that we should talk plainly, because so many are planting grapes, and so many are likely to be misled by the old practice, and by the written instructions copied from books, in regard to trenching, manuring, and excessive feeding, which would probably cheat them of success instead of giving them success.

In planting the grape, as I said before, in regard to manure, I should prepare the land as if for corn. I should plant in rows north and south; the rows ten feet apart, the vines six feet apart in the row, so that you would have wide rows to work in with your plough, your cultivator, and your cart for gathering the crop; and, the plants being six feet apart, you have sixty square feet for each plant, or about seven hundred and twenty-six plants to the acre. Planted at this distance, strong growing vines will be close enough. I have tried all the various distances recommended by the books, and I find that our strong growing, native stock requires more room than the foreign grapes. Half a rod each way, which has been recommended, would be a very good distance; but the method of placing the rows ten feet apart, thus facilitating and cheapening the culture, seems to me to be better, and therefore I adopt it. There is another reason for this mode of planting, and that is, that the sun may lie upon the ground between the rows and heat the earth down to the deepest roots, in the middle of the day. If your espalier is six feet high, you will be able to gather your grapes, by this method, very easily; and perhaps it is the best method.

When you plant, keep in view the fact that the grape wants heat at the root, and that, if put too deeply into the soil, they will not get that heat at the root which they need; and that other fact, that in dry soil they must not be so near the surface as to cause them to suffer from the summer drought. You will plant them about six inches deep. The roots should be spread in every direction carefully, and never left crossing each other; for if they cross each other the sap is intercepted, and the roots do not perform their functions for the grapes. Having planted them and covered them carefully with the hoe, I should not touch them again that season, any further than to keep down the weeds in the row. The reason for this is plain. All the leaves which these branches contain help to make roots, do make roots. The more foliage you have on your vine, the more root you will have at the end of the season; and since you will in any event prune back closely at the end of the first year, I would by no means pinch the growing shoots in the summer. Your vine will then be left to run about upon the ground, and to be blown about by the wind; for every movement of the branch facilitates the vegetable processes going on in the plant, as has been found by experience; and, in fact, writers on horticulture, in the magazines of this day, recommend this very mode, which I have used for ten or twelve years, as the result of my experience, and which I recommend to you as not only the best way, but the one involving the least trouble.

When you have got to the end of the first year, you want to begin to shape the vine, and therefore you cut it back to a single stem, which you leave of greater or less length, according to the strength of the stem. It should be not less than twelve or fifteen inches from the ground, to facilitate culture about the grape, the hoeing, weeding, &c. If you train upon the espalier, your first wire will be eighteen or twenty inches from the earth, which is low enough to lay out the lower or first branches for fruiting; and therefore you will leave your main stem of that height. For training upon poles, twelve inches will be enough. As this is always to be the main stem of the grape, no other growth can be allowed from the bottom. From that main stem you train your branches. If you prefer training on poles, then two systems of pruning occur to you, the renewal system and spur pruning. If spur pruning is to be adopted, one pole is sufficient; if the renewal system, two poles are required, and you must train the wood alternately on one pole and the other. The objection to the renewal system, in my mind, is this: that on the long shoot, which you will leave, although it may be covered with well-ripened buds, you are not sure of getting good bunches of fruit throughout the whole length. The sap rushes to the end of the upright branch, and pushes the buds there first. The bunches are largest there; the bunches below that point start later. I am aware that when the root is large, and the vine has attained its utmost vigor, it will have sufficient strength to push all these buds, and give you bunches of equal size; but in the early period, for three, four or five years, you will find in the renewal system, the best bunches at the top, and the meagre and less valuable on the lower part of the stem, therefore I prefer spur pruning.

Spur pruning means leaving the shoots of the current year in short spurs of three or four eyes, on each side of the old wood for the next year's bearing; cutting out alternate spurs to one eye, to make new wood for the next year's bearing; when you will cut back those spurs which have borne fruit this year to one eye to make bearing spurs for the next year, thus keeping all your spurs near to the old wood and avoiding unsightly stubs.

It is the easiest mode of cultivating and pruning; when once well established, an intelligent boy, fourteen years old, can prune your vineyard as well as yourself. Usually, the fruit ripens a little earlier on the spur; and there seems to be a good reason for that, because you have cut away all but three eyes, and they were the eyes which were first pruned, and are, therefore, the most solid and well-ripened; and being nearer the main stem, the sap does not have to traverse so long an extent of wood to reach the fruit. You would, I think, in the summer, find it profitable to pinch excessive growth; and it would be a safe rule to pinch whenever a shoot had grown, say twelve inches, perhaps sooner with short-jointed wood; and wood will be shorter or longer jointed, according as the stimulus at the root pushes that wood with more or less vigor. If you have just the right quantity of root to support the vine, the wood will be short-jointed; it will have its eyes three or four inches apart; if you feed it excessively, the joints may be twelve inches apart. The long joint is objectionable. It shows you have pushed your wood too fast, the buds are not so strong and the wood not so solid. You would find, therefore, in spur pruning the advantage of having the first ripened wood and the first developed buds.

As to the time of pruning, November is the best season. Having, at the end of the first year, got your main stem established, you would lead, if in pole culture, one stem from it, if in trellis culture, two stems, which would be tied on to the espalier diagonally, at an angle of forty-five degrees say, and pinched occasionally, that the wood might be made robust and solid. No matter if your grape does not grow—and some kinds will not—more than twelve inches in a season, still I would pinch the terminal bud, that the others might be consolidated and made robust. With rapid-growing vines, six feet of wood would be made, perhaps; still, you would pinch at every twelve inches, so as to make sure of solid wood, and strong, well-developed buds. This brings you to the third year. In the third year, you will cut back these laterals, these diagonal arms, to a strong bud, though it take you back very near their base; for these arms are to remain in the future, and be the vine which may continue, perhaps, for a century, if properly cared for; for the grape is one of the longest-lived of all fruits, if cultivated with care. There are specimens in this country with a diameter of trunk of twenty-four inches, and which were believed by Downing to be two thousand years old. You want to proceed, therefore, as if your vine were to remain there forever; you want to make that wood solid and enduring; and, therefore, you will cut back these diagonal arms at the end of the first year of their growth to a strong bud and to solid wood, though it take you very near their base. The next year, being the third year from planting, the spur which you have left will give you some fruit. You will have seen, probably, that your vines are strong, well established, and capable of carrying a crop—a light crop—the first crop. If they are weak, for any reason, they should not be cropped that year, or ever, until they get well established. But if well established the third year, you may take your first crop; and you may safely take, with the Concord, for instance—which is the grape I have planted in field culture, five pounds of grapes to the vine. The spurs will usually set three bunches; pinch the growing wood at the first bud beyond the last bunch, and cut away one or two of the bunches, leaving the strongest, so that the vine may not carry more than five pounds. At the autumn pruning cut back the first spur to three eyes, the second and third to one eye each, and the fourth spur, which will be opposite to the first, to three eyes. The spurs left with one eye each make your bearing wood of next year. The spurs of three eyes, which bear this year, will be cut back, at the end of the season, to one eye, to make bearing wood the next year for successive fruiting. By this method you annually alternate your spurs and keep the bearing wood close to the main stem.

If, for any reason, your spurs are weak, cut them back one eye to make strong wood for the next year's bearing,—never fruit a weak spur.

Suppose you have too much wood; there is but one remedy, and that is, to withhold all feeding of any kind until the crop, to which the strength of the vine goes, has exhausted the vine sufficiently to bring it to its proper balance. A too strong vine will sometimes take four or five years to attain that balance; and, as I have said before, you will know what that is by the fact, that when you have the true proportion between root and branch the new wood will be not more than two feet and a half in length, with short joints and full buds. Your vine is then in a state of perfect balance, and in the proper condition to give you its best crop.

Pole culture, you perceive, would be the same thing, except that, in the renewal system by two poles, these arms are cut close to the main stem alternately,—one this year, we will say, and the other the next. Usually, one of these spurs shoots one eye, and the other two. If both grow, you will take out the weakest, and train up the strongest on the pole. Though you have two new shoots for the current year, at the end of the season you will cut one of those out close to the main stem, and the other one you will cut down to the point where the wood has ripened buds, well enough developed to bear your fruit. Now, you have got one shoot for bearing fruit, and one spur for making wood, the succeeding year. The one that is to bear fruit goes to the top of the pole and bears its fruit, and that which is to make wood, makes new buds and new wood, to bear fruit the next year, and so on alternately. That is the renewal system which is adopted at the West, in growing the Catawba grape; but many of the growers are now going into the espalier culture, as on the whole the most economical, and certainly the best, as giving two long arms of bearing wood, which do not need to be constantly renewed, and giving annually larger crops than are obtained with the pole culture; and, lastly, saving the trouble of perpetually renewing the poles, which must be renewed every second or third year, while the espalier does not need to be renewed oftener than once in ten or twelve years.

But at the base of all this pruning lies the great fact, that if you have too much root power, you cannot handle the top, and, therefore, you must not feed your vine too much. If it will bear a little more feeding, give it to it afterwards, so as to make the vine grow to the size you want; but if you have too much root power, you must let the top grow, and it may be in many cases impossible to give it proper extension; certainly it would be in vineyard culture, after it had filled your espalier.

If, now, you have your vineyard, or your vines in open field culture, you will look the third year for your first crop; and you may take, as I have already said, from well established vines—those vines which are in good health, and making their half a yard or two feet of new wood annually—five pounds to the vine, safely. Much more has been taken, without apparent harm, but in presenting to you these facts out of my experience, I take the sure and safe side, that you may not be disappointed. Although I might state much more extravagant results, much larger crops which I know to have been taken in successive years from young vines, I forbear to recommend such a course to you, because, when you begin the culture of the grape, I want you to have absolute success and long-continued success, and this method will insure it to you. You may take, then, five pounds to the vine the first year; the next year, ten pounds to the vine; the third year, of cropping, you may take fifteen pounds to the vine; the next year, and from that time forward, you may take twenty pounds annually to the vine. I know a piece of ground, of such soil as I have described, in the town where I live, and belonging to townsman of mine, which for three successive years has given crops exceeding this estimate largely, without any application whatever since they were planted, seven years ago, but wood ashes, at the rate of fourteen bushels to the acre. It is not liberal to the vineyard, it is not fair treatment of the vines, to crop them in such a heavy way, nor do I believe that in the end it will be so profitable to the vineyard owner; but it is true that the very first crop taken from this vineyard was at the rate of nearly three tons to the acre; the second crop was at the rate of seven tons to the acre; and the crop he took from it this year, being the third crop, without enriching in any way, was at the rate of eight tons to the acre. These are excessive crops, and not to be counted on always. At Kelley's Island, where they grow the best Catawbas, they boast of a crop of three and a half tons to the acre, as if it was a large crop; and it is a large crop. But you are to remember that that grape has a constitutional defect—the rot—always weakening it more or less, and sometimes excessively, otherwise it might, perhaps, give the same weight. Your first crop would be at the rate of more than 3,500 pounds to the acre; your second crop, 7,000 pounds; your third crop, over 10,000; your fourth, 14,000 pounds, or seven tons to the acre. I have shown you that that crop has been exceeded for three successive years, from a vineyard treated as I have described. I think I may assume, therefore, that this would be a reliable annual crop. Some of the vines in the vineyard I have spoken of, bore thirty-five pounds this year. I have estimated twenty pounds to the vine as a full crop, and that will give you in round numbers, seven tons of grapes as the usual crop.

Now, can anything be more profitable than grape culture? I have endeavored to show you that grape culture is absolutely certain, under certain conditions. They are conditions within the reach of any man within Massachusetts. That it is more profitable than any other crop is within my experience; and that it is more sure and constant than any other crop is also within my experience, for I have for many years never failed of a crop.

Now, how shall we get still better grapes? for that is the problem before us. Chance seedlings, or grapes bred from tender, though excellent varieties, and inheriting the tender constitutions incident to the family to which they belong, will never do for field culture, though they may do for the amateur. We want yet better grapes, and I think we may have as good grapes as those of any other country in time, if we only go about raising them intelligently from seed. Constant reproduction from seedlings having the indispensable qualities of hardihood, vigor of growth, adaptation to the season and vicissitudes of climate, will give us still better grapes than we now possess. I will give you some of the results of my own experience in that direction, in the hope that some of you will take up this really national work, that our final success may be more rapidly achieved; for the seeds of the same grape would show greater variation from the original type when grown in various soils and aspects, than upon the soil where it originated, when all the conditions of soil, climate and culture were the same always.

Beginning with the wild grape—the best I could find—the earliest, having also those qualities which I have endeavored to describe to you; I got, from the seedlings of that grape, first the mother of the Concord; second, out of that seedling, the Concord; out of the seeds of the Concord, many new grapes, nearly a score of which are great improvements over the Concord; so that the pulp, which is one of the distinguishing characteristics of our native grape, is lost, and you have a grape of tender and delicate texture throughout, like the hot-house grape; so that the wild flavor so objectionable to us is lost, and there is now no sign of wildness about it. Indeed, I venture to say, that if I were to show you several of these new grapes at this time, and tell you they were seedlings of hot-house grapes, you would assent to it. So far as the texture, appearance, and even the flavor are concerned, you would say, "These are better than any of our native grapes," and that the foreign grape must always be the best. I could deceive you, I think, into that conclusion, so great is the improvement. From these, again, I have seedlings now two years grown. In five years they will come to fruit, and I shall have a new point of departure. I know it requires patience, and some enthusiasm, on the part of a man to grow seedling grapes and wait six years for the first fruit; and when he has got his first fruit, perhaps it is not so good as he expects; but if it is pretty good, if it is an improvement, if for any reason it is worth saving at all, let him count confidently on its improving for several years, from year to year, for that is the uniform result. The fruit of the first year is not so good as that of the next, other things being equal, and it grows better and better for several years. I plucked this year, on the twentieth day of August, one white seedling grape, and one black seedling from seedling vines planted ten years ago. And that brings me to the consideration of a point I ought to have mentioned before, relating to climate. The grape wants heat at the time of ripening the fruit. Now, if it be late, ripening when the early frosts have come, and our nights have grown cool, and our days foggy and cold, it cannot be so good. It will not ripen so much in two weeks of such weather as it would in four days of absolutely hot, clear weather, such as we have in the latter part of August and early in September. Therefore you want an early ripening grape, if it be possible; but if your seedling be a little late, or if the weight or the quality does not come quite up to your expectations, by reason of the circumstances I have just mentioned, do not reject it altogether; but if it be worth keeping at all, count upon its being, in a more favorable season, like this last, much better.

As to soil affecting the quality of the grape, I ought to say a word. It does. The best grapes are grown in the sweetest and best soil. That is to say, soil naturally sweet of itself and fed with such vegetable and animal manures as do not convey to it disagreeable odors; for the soil takes odor, and the grape takes odor from the soil. I know that absolutely, for, having applied some wool waste to some young seedling vines which I wanted to get rapidly forward,—seedlings which had borne once, and of which I wanted to see a second crop,—which wool waste was unctuous with fat and grease, will you believe it when I tell you that I found the abominable flavor of that half decayed wool waste in my grape in the autumn, and so did everybody who tasted it. The grape abhors foul odors. It is a dainty feeder. Although it will bear so much feeding, under certain circumstances, yet it absolutely needs, in my judgment, only that peculiar kind of feeding which comes from vegetable debris and those minerals which its constitution requires.

I have recommended the raising of seedlings by direct descent for two reasons; because, in the first place, hybridization is so difficult; and because, in the next place, when you hybridize the finer grapes known to us now, which are tender grapes, upon the more hardy mother grape, to get the quality of the better grape and the hardihood of the mother grape, we are not quite sure of success. It is a hybrid, and must always be; and although it may have more of the hardy constitution of the mother than of the tender constitution of the higher flavored and better male parent, still, it will have a constitutional predisposition to tenderness; and though you may possibly get a grape which will bear the climate, it is more than likely that in that event, you have not a true hybrid,—that is, a hybrid that is accepted without dispute as a true hybrid,—that is hardy. I know that Mr. Rogers has raised some hybrid grapes which are of good quality, and great acquisitions, as I think; but I believe the savants in horticulture, many of them, at least, and more from day to day, have come to the conclusion that they are not hybrids at all; and that is my opinion. I conclude so for this reason. These hybrids were raised from a seedling grape and the Hamburgh and other hot-house grapes. Now, the seedling grape is itself an improvement on the native grape, and these seedlings are in the second generation from the original native stock, and hold the same relation, therefore, to the native that my Concord holds. He has done just what I have done: broken the habit of a wild grape, and improved it to that stage that led him to think he had got a true hybrid. Let us look at this matter a moment. The grape is perfect in its flowers. Each flower contains the male and female organs, and is covered by a calyx. When the stamen is elongated, this little calyx is thrown off, under the stimulus of the sunshine, and in that act the pollen, which is thoroughly ripe and effloresced, impregnates the germ. Now, if you are going to hybridize, how will you know whether that has happened or not? Why, you must sit and watch the blossom as it throws off this little calyx. You must have a large magnifier to see whether the pollen was effloresced and has impregnated the germ, or whether it is hard, close, and not ripe. If ripe, you cannot impregnate that germ, although you have the pollen ready. But if you find one, the pollen of which is not ripe, but where it is close and hard, that germ you may touch with the prepared pollen, after cutting away all the weak parts, and you have a true hybrid. It is not, you see, impossible, but it is very difficult.

I spent a fortnight in my hot-house, with my daughter, from nine o'clock in the morning until four in the afternoon, impregnating a Concord which I had there for that purpose. I had not the least idea that it was a work of so much difficulty and so nearly impossible as it proved to be. Hybridization, therefore, is not impossible, but I do not believe it would be practicable. However, if I wanted to hybridize, I think I would do this: I would take the very best hardy grape, which had the properties which I wanted to get in the progeny, and impregnate it from another grape which had other properties, a union of which would give me just what I wanted. In other words, both being perfectly hardy, I would go to all this trouble to hybridize, in order to get the result I aimed at more speedily,—that is to say, the properties of both parents into one seedling, which should be perfectly hardy. But I have shown you that you would be more likely to reach your aim directly by raising seedlings; and for your encouragement I would say, that I raised two thousand before I got anything to surpass the Concord, but since then, of a thousand seedlings, over one hundred have proved to be good; so that one hundred seedlings would be likely to give you at least ten good grapes.

Now, I want your help. I have given my life to this work, not solely for the benefit of others, not alone for a selfish purpose, but because I must do it. The enthusiasm which has animated me in regard to grape culture for thirty-five years does not abate, but increases with increasing years; and so long as I live, I shall go on with my work. But I must depart, and if somebody does not follow it up, we shall never have what we ought to have,—an American grape which shall excel all others.

Gentlemen, I thank you for the patience with which you have listened to me so long.

Mr Lathrop moved a vote of thanks to Mr. Bull for his able and interesting lecture. Prof. Agassiz seconded the motion, and said: I cannot express how delighted I have been with it. I am a child of the vineyard, and I know how important it is to a country to have vineyards to grow wine, and what advantage to a people it is to have sound wine, and to be able in that way to drive out all intoxicating liquors. It is the most excellent temperance movement that was ever started on this continent, and I believe that Mr. Bull will be a benefactor to his country by what he is doing. The vote of thanks passed unanimously.

Mr. Phinney, of Barnstable, moved the addition of two members to the committee on the Agricultural College, which motion prevailed; and the chair appointed Messrs. Phinney and Stockbridge to the committee.

Dr. Loring.—It is very doubtful whether the question in regard to the corn crop will be discussed again. It was pretty well discussed this morning, but I wish to propose two questions for the consideration of the meeting and for its action. No doubt the mind of every man is made up in regard to them. The first question is: Would you plough sward land and put the manure on the surface, in autumn, for a corn crop? The other is: Would you plough sward land in the spring and turn under the manure for a corn crop?

Mr. Tidd.—It seems to me that the diversity of opinion in respect to this matter arises, in some measure, from the differences in soil.

Dr. Loring.—I proposed the questions with the express purpose of having some explanation of that sort go with the discussion. I am satisfied that each gentleman would vote on these questions according to the character of the soil he is called upon to cultivate.

Mr Bull.—The question, even in the simple form in which it has been presented, involves so many considerations of soil and climate, heat and moisture, and succeeding crops, that I would rather have it laid over for future consideration than to take a vote upon it now.

Dr. Hartwell.—I should rather object to this Board of Agriculture undertaking to decide as to the best method of applying manure, and have it circulated through the Commonwealth for the farmers to follow, perhaps to their disadvantage. It seems to me we should hesitate until we have further light. We are not prepared, now, to make so important a decision.

The questions proposed by Dr. Loring were laid on the table, and the meeting adjourned till afternoon.

Afternoon Session.—The Board met at two o'clock, and took up the subject of the

IMPROVEMENT OF PASTURE LANDS.

Mr. Anderson, of Shelburne, was called upon to open the discussion. He said: I came here with no expectation of giving my experience. It is true that grass-growing and stock-raising, which are intimately connected, are the principal objects of my labor, the things I take the greatest interest in, and, in fact, that I profess to know the most about, but to give my views, unaccustomed as I am to speaking, will be difficult.

Some thirty years ago I commenced farming. Formerly I was engaged in teaching, but my health failed, and my physician told me I must seek some other employment. I accordingly left, and went on a farm. At first, I was not able to labor more than two or three hours a day, but I soon found I was improving. My object was, originally, to recruit my health and go back to teaching, but I soon became satisfied that in order to enjoy health, it was necessary for me to continue this active employment. I went on a farm of some two hundred acres, probably as unpromising as any in the county of Franklin. It had been worn out by ploughing and raising grain. To begin with, they raised wheat as long as they could, and then corn and rye. The pastures were ploughed as long as they would produce anything; and when I went on to it, the probability is that ten head of cattle was all it would support. The pastures were covered with bushes, brakes, and every kind of noxious vegetable that is entirely useless to the farmer. I commenced with mowing the sweet fern. My neighbors told me that it was labor lost; that where I mowed one bush ten would spring up. But, to begin with, I knew something of the laws of vegetable life; I knew that cutting down a vegetable and destroying its leaves, which are its lungs, must eventually kill it. These ferns were thick and large, and after mowing them I raked them into bunches and burnt them, so as to leave the ground entirely clear to mow over the second time. When they came up the second time I could go over it with a common scythe and mow it as fast as I could grass, and faster, too. The third year there were but very few left; and the fourth year they were all gone; and this land, that was covered by this kind of vegetable, is now the richest and best of pasture land. After disposing of these, I went at the brakes. I mowed them down, and kept them mowed down, and destroyed them, so that there is scarcely a brake on the land.

My idea of the improvement of pasture land is that the main thing is to clear every noxious and useless vegetable out of the way, and let the grasses have a chance to grow, and they will take care of themselves. Another thing I am satisfied of, is, that if land is let alone, it will recuperate itself; that nature's operations are the surest and best. I never would plough land for pasture or for mowing, where the surface is smooth and free from water. On some portions of this pasture, where there were strawberry vines, the "five-finger," so called, white grass, and different kinds of vegetables that stock will not eat, I sowed plaster. The effect of that was to start the clover and other grasses; and when the clover starts on land where this white grass grows, the cattle will eat the clover and pull up this grass. After you once get your pasture lands into good condition, there is no further trouble; that is, if you do not feed them too close. It is a law of nature, that the root must be somewhat in proportion to the top. You will always observe, in pastures that are close fed, that the roots extend but a short distance. If you will allow the grasses to grow, they will penetrate the earth and answer the purpose of subsoiling. Clover is one of the best vegetables for this purpose; it penetrates to a great distance. The Canada thistle has been considered as one of the greatest curses to the farmer; but I consider it a benefit to our farms. There is no vegetable that penetates so deeply and leaves the soil in so good a condition as this does, and it is not very difficult to get rid of it when you want to. Where they grow very vigorously their roots, of course, extend in proportion. The probability is that their roots extend three or four feet in a deep soil; and if the soil is not deep they will deepen it; and after they have left the soil, they leave a considerable amount of vegetable matter to enrich it.

This farm that I have been on, and have attempted to improve, would not carry through the summer, when I took it, more than ten head of good cattle. The probability is that the value of the stock when I went on the farm was not more than five hundred dollars. To-day I would not take four thousand dollars for my stock. I have forty head, and I believe they would sell for that at auction.

Well, there has been no mystery about the matter. I have let nature work. To be sure the soil is naturally of a good quality; but it looked as poor as any soil could look, judging from the grass and everything else it produced.

Mr. Lathrop.—I would like to inquire how you get rid of the Canada thistle.

Mr. Anderson.—When they are in full bloom, I cut them off. If they are mowed about this time, the stalks, which are hollow become filled with water, and they do not grow again. I have found that in two or three mowings I got rid of them. But if you have to mow them every year they will abundantly compensate you for the labor.

Leander Wetherell, of Boston.—I simply wish to say that I had the pleasure, this past autumn, of going over the pastures Mr. Anderson has spoken of, and the results which he has stated seem to have been fully realized; for I have not been on any pastures that I was so well pleased with since I was on the Kentucky blue-grass pastures, of which his reminded me. I was there about the first of October, and they were then covered with an excellent crop of grass, notwithstanding the dryness of the past season. Mr. Anderson stated to me one fact, which he has not mentioned here, and that is, that in the spring he goes over the pastures and beats the droppings of the animals to pieces, so that they are scattered over the surface of the ground. That is a labor to which but few farmers would subject themselves.

Now that I am up, I would add that plaster will recuperate pastures where it will work. I asked a gentleman, who lives in the town of Hardwick, in the county of Worcester, where the pastures are very good, how they compared with what they were twenty-five years ago. "Well," said he, "I can say that they are better; that these dairy pastures will keep more stock now than twenty-five years ago." This, I suppose, is explained by the fact that plaster works well on those pastures; and having been applied occasionally it has kept them in this growing and luxuriant condition. But then, there are many acres of pasture in this Commonwealth, where plaster will produce no more effect than so much sand sown upon the surface. These pastures must be recuperated in some other way. I agree fully in the remark made by Mr. Anderson, that pasture land that can be depended on for grass is better and more enduring if it has never been ploughed or harrowed, than land that has been broken up. I have observed an illustration of this on a hill in the east part of Ware, where the land was tilled, and bore excellent crops; afterwards, it was seeded down and turned to pasturage; and that pasture is now a great deal inferior to a pasture right by its side, that never has been ploughed. I believe that the same is true with regard to mowing lands. I consider land that is in a condition to produce grass naturally, and that has never been ploughed, the most profitable mowing land, as the other is the most profitable pasture land.

With regard to the mode of destroying bushes, I can give you a fact that came under my own observation. A pasture was grown over with elders and white birches, which were cut close to the ground, raked up and burnt, and then plaster was sown on the ground. There was hardly any grass to be seen at that time, but a good crop of grass immediately came in; and after a second cutting of the bushes, there was no more cutting to be done. I think it is true, that if you can make grass grow you will destroy the brush, and if you cut the brush low, and often, if necessary, I think you will find that with the aid of plaster, or some other fertilizer, you will remove the bushes, and produce a good grass crop.

Mr. ANDERSON.—I will say, that I think no labor bestowed on my farm pays so well as this knocking to pieces and pulverizing as fine as possible the droppings of the cattle. Pastures that were very uneven when I began this operation have been made smooth as mowing land, by spreading these droppings. Another thing that I have attended to a great deal, is the removal of stone. Our pastures are stony. On some of them, it would seem as though the surface was covered with stone. When I began to pull up these stone, one of my neighbors came along and said: "You are injuring your land; your labor is worse than useless. Those stone warm the land, and stony land will produce more feed." Well, I paid but little attention to it, because, as far as my experience went, the grass around stones was not more luxuriant than it was at a distance, but generally the reverse. Then land that is covered with stones will not stand drought so well as land that is free from them. Stone, from the very nature of the substance, absorbs caloric, and heats the soil. I had always observed that stony land dried first; and before I commenced this operation, our pastures suffered from drought more than neighboring pastures. After removing these stone, and encouraging the grass to extend to a deeper depth, these pastures suffered less than any of the same character.

The CHAIRMAN.—Mr. Anderson has certainly advanced some ideas that are valuable. Whether they are applicable to the whole Commonwealth is a question. I should like to hear from some gentlemen who have had experience in this matter. His statement that he can raise more grass upon his pastures without the plough than with it, is a very important one to discuss practically.

Mr. Lathrop.—The best piece of pasture that I have, is a piece from which the timber was cleared in 1840. In the winter of 1850, the cord wood was drawn off. The sprouts were then four or five feet high. Next year I cleared them off, and sowed plaster at the rate of one hundred pounds to the acre. That pasture will summer a cow to the acre, on the average. It is now covered with white clover and Kentucky blue-grass. My other pastures were covered, some sixty years ago, with small pines. These were cleared off and plaster sown, and the grass commenced growing very luxuriantly. The owner, who had six hundred acres, could hardly buy cattle enough to eat up his feed, whereas he had formerly been obliged to send his young stock away to pasture. We take pains to mow our brakes and Canada thistles, for we are not so fortunate as Mr. Anderson, and find that no grass will grow up among the thistles. I can only say, that we attribute the improvement of our pastures more to plaster than anything else. I should not plough woodland, nor burn it, but let the leaves and small brush remain to enrich the soil.

Mr. Wetherell.—Some twenty years ago, the Essex County Society put forth the inquiry, whether plaster exhausted the lands. There was a gentleman in our village who had a plaster mill, and I knew his way was to use his plaster quite freely on his land. I went to him and asked him, "How long has your pasture been plastered?" "For some over thirty years; sometimes once a year, and sometimes twice." "Well, what was the condition of that land previous to the application of the plaster?" "I had six acres, and could barely keep one cow. I have reduced it down to about four acres, and keep a horse, a yoke of oxen, two cows, and sometimes a calf." And that pasture will do the same thing now. I think if plaster would exhaust land, that would have been exhausted long since.

Asa Clement, of Dracut.—The pasture land in our locality has deteriorated within my recollection greatly, and it has been a part of my study, at least, to learn to improve my own pastures. I have come this conclusion, that it is, as has just been remarked, bad policy to burn upon our soils, when there is so little vegetable matter in them. If you must burn at all, let it be in a very slight manner. I recollect that last year I cleared a piece of new ground. There were some white pine and elders on it, and I burnt the brush that was scattered over the surface. I did not pile it up, but let the fire run over the surface very lightly; and very soon I saw bunches of white clover coming up, and by autumn, it had nearly covered the ground. Then again, I have been accustomed to mow the bushes and brakes, and all noxious weeds and vegetables, and let them lie upon the surface and decay. I would, as a general thing, repudiate the idea of burning brush upon our shallow soils. There may be exceptions, however. We have found, on many of our pastures, that the labor of keeping down the brush, and the white birches and alders, has been more trouble than the feed we got has been worth; and consequently, some of us have let our older pastures grow up to white birch. To be sure, it is not the best quality of wood, but we can always sell it for something—for all it is worth perhaps—and clear new lands. These new lands produce fine, sweet feed, and if the brush is left to decay upon the surface, good white clover will come in, and will last, there is no doubt, a great while.

Mr. Anderson.—I would like to inquire in regard to the dryness or moisture of the pastures.

Mr. Clement.—A portion of this soil is dry. In some places there are what we call "runs" through it, that are tolerably moist, and the white birches that grow up become quite sizable trees in a few years. On the knolls where the soil is thinner and poorer, the trees are dwarfish, and will die down before they become useful for fuel. Ordinarily, we can spade down two feet very comfortably. There is a hard-pan twenty inches or two feet below the surface. A good deal of it is none too wet; and last year these knolls looked as though they had been burnt over.

Dr. Hartwell.—Gentlemen have been speaking of those pastures that are improved by the application of plaster. There is a kind of land in Worcester County that plaster improves; there is another kind that it makes no impression upon whatever. Clayey, moist soils are improved very much by the application of plaster. The diluvial, or drift soil, with the gravel which overlays, in some instances, this formation, is never improved by plaster. You will find that there are pasture lands where the upheaved rock abounds in sulphur. These lands are not improved at all by plaster. I have one pasture which plaster improves and one which it does not improve. The latter I have improved with ashes or manure. I know of no way of improving a pasture of that kind except by giving it some foreign aid, aside from plaster, to bring it up. The method I pursued with one pasture was to mow off the bushes and dress it over with compost. That will certainly bring in any kind of grass, whether you sow it or not. Horse manure, sown upon the surface, is death to these bushes; they can't stand cultivation; and if you can manure these pastures so far as to bring in a crop of any grass that the cattle will eat, you will be sure to drive off all the old bushes. The grasses, such as clover, June grass, and red-top, leave out in the ground; all the great sour plants leave out high; and, as I said, if you continue to cut the plant below the leaf, you are sure to kill it. We have not the means of bringing up many of these old pastures, for the supply of manure is limited; but all those lands that are improved by plaster can be improved, because the amount of plaster of Paris is unlimited. Lands which will be improved by plaster are worth more than double, I think, what those lands are that plaster will not improve. The only way to do with those old pastures that we have not the means of bringing up is to let them go back to wood. They can be renovated in that way, and it is the only way in which a great portion of the waste pasture land in this Commonwealth can be restored to advantage.

Mr. Wright, of Deerfield.—My experience in reclaiming pastures is exceedingly limited. Some ten years ago, I purchased a portion of a field (fourteen acres,) which had been used, before I bought it, to pasture two cows. I had the impression that it could be improved. I hired the pasture the first year, to experiment upon it somewhat. I was satisfied, from the result of one year's operations, that there could be an improvement made. I purchased it, and my neighbors joked me severely upon the exorbitant price I paid for it. Probably no man in the neighborhood would have given half the amount I paid for it. I paid twenty-seven dollars an acre, and it had, within two or three years previous, been sold for ten dollars, but I could not obtain it for any less. The year I came into possession, I put in three cows. Two of my neighbors were at my place, talking about the purchase, and they said they thought I had got my place pretty well stocked; that they didn't believe the pasture would carry through those three animals. I remarked that I didn't think it would, and I should remove one of them in the course of the season. However, it was a fine season for the growth of vegetation, and they lived through the summer. The next spring I commenced my operations. In the first place, I removed all obnoxious vegetation; I made a clean thing of it. It cost me a good deal of labor, but when it was brushed over, it looked very smooth. I then took twenty bushels of ashes, three-quarters of a ton of plaster, and eight bushels of hen manure, and composted them together. It lay some two or three weeks, and then I scattered it round the fourteen acres, broadcast. It had a very wonderful effect. I have continued this same dressing up to the present time. I commenced this operation seven years ago, and the season before the last, I put in seven cows and three early spring calves, and had a very fine pasture. This last season I put in the same, but in consequence of the severity of the drought, I removed two of the animals. But from the experience I have had with this tract of land, I think, if I am permitted to live three years, I can keep ten cows on this pasture, and that they will be able to fill themselves in two hours, and lie down. There is a great deal of real estate in the town of Deerfield that is useless. We are so situated that we are in want of home pastures, which we do not possess; but I am satisfied that if the proper measures were taken to reclaim this waste land, we could be well supplied with beautiful pastures, within a stone's cast, almost, of our homes.

Dr. HARTWELL.—Have you made the experiment with plaster alone?

Mr. WRIGHT.—I have, sir. The pasture is very hilly, with the exception of two or three acres upon the top, which are flat, and the soil is a sandy gravel. I think that plaster alone would not have much effect upon it. If I come down the hill a little, some ten or fifteen feet, where it is clay, there I get the effect of plaster alone.

Mr. SMITH, of Northampton.—I have the misfortune to own something like a hundred acres of land occupied for pasturing, which is situated very differently from that in the neighborhood of my friend, Mr. Lathrop, of which he has given a description. Plaster alone does not seem to have any effect upon it whatever. It is ground that has been ploughed, heretofore, for a long series of years. I should endorse fully the sentiment that has been expressed here, that it is no improvement to plough or burn forest lands newly cleared. I have made some little effort to kill out the brush on my old pastures, where there are the high laurel and sweet fern. I consider the laurel one of the hardest bushes in the world to kill. It is hard to plough up, and cutting it off seems only to give new vigor. I have tried burning, but so many leaves fall from it, that they make a light body of matter that burns very readily in a dry season; and I have only to follow that up about three years, to eradicate all the grass that does grow on the land. I find it eradicates the grass, but does not hurt the bushes,—they grow finely. This land is situated on the sunny side of Mount Tom, prettily located, but rather rough. The soil is a stony loam or loamy gravel. It was naturally a strong soil, but it has been ploughed to death. It produced a heavy growth of oak and hickory, and when it was first cleared off, in my grandfather's day, they used to get good wheat from it—much better than they got on the river flats. Consequently they ploughed, and planted, and cropped, without returning any thing back, until they entirely exhausted it. These lands have not been ploughed much for the last thirty years. We have been expecting that by adopting a system of pasturing and keeping the bushes down, they would eventually improve, but the improvement is very slight, if any. I have commenced ploughing, to some small extent, to renovate them. I turn over a piece as well as I can, for stony ground, and sow rye, with ashes or guano, or any fertilizer that I can get up there; I cannot spare manure to use up there. Ashes work well. I have used in connection with ashes, plaster. I cannot see that plaster, applied alone, has any effect; it may with ashes. In that way I get a pretty good growth of rye. But I do not harvest the rye. I let it stand until it has headed out, and then turn in my cattle and feed it down. In that way I have improved the land, as far as I have tried it. It has given me the most satisfaction of any method I have ever attempted. It makes an abundance of feed, and my seed takes well, sown in that way. It is not very expensive. Fifteen or twenty bushels to the acre will give a pretty good growth of rye, and will cause grass seed to spring up and live. One piece of four or five acres that I ploughed-up a few years ago, has produced more feed than any ten or twenty acres of the same piece.

Mr. Anderson.—I still contend that I can kill the high laurel. It is a good deal more difficult to kill than sweet fern, but I have succeeded, on pastures where I have attempted it, in the course of six or seven years. It requires a good deal of time and attention, but if you cut it down smooth to the ground in the first place, and are assiduous in your labors as soon as it comes up, you will be sure to kill it. It can no more live without its leaves, than a man can live without lungs.

I would like to inquire about ditching. I have, by expending perhaps twenty-five dollars on four or five acres, in digging ditches and filling them with stone, made land which was formerly useless, the very best land I have. A great deal of our pasture land is too moist. Pasture and mowing land should be dry enough to raise corn. The best corn land is the best land for grass, and I think we should derive as great benefit from ditching our pastures as we should from ditching our mowing land.

Dr. Hartwell.—Is there any plant that will not die if you cut it below the leaves?

Mr. Anderson.—No, sir. I remember that, formerly, our best mowers were considered those who mowed close to the surface; and I have known them mow so close on our best lands, where we had been accustomed to have a second crop, that we could not get a second crop; whereas, on other parts of the field, that were mowed so as to leave something of the herbage, it would start right up and grow. The other would not start that year, and would be injured for years after.

Mr. Perkins.—One word in regard to cutting down trees and vegetation. I maintain that if you cut hard wood from this season until the first of May or June, it will not kill it. You may cut any kind of vegetation from the latter part of August to the first of October, and effectually kill it. If I am cutting in the forest, and wish it to sprout up again, I cut only in the spring; if I don't want it to sprout, I cut from the latter part of August until the first of October. I have cleared thirty-five acres of meadow, that was just one mass of underbrush. I cut this brush in the month of August or September, and effectually finished it; there was no sprouting; if I had cut them in any other season, they would have grown again.

E. W. Stebbins, of Deerfield.—Is that so with regard to the walnut? Can you kill out the walnut sprout by cutting it once or twice, or even twenty times?

Mr. Perkins.—We have no walnut timber in our place, and I cannot say from actual experience; but I have no doubt that it can be effectually killed. There is a time when the life of the tree is pretty much done for this season, and does not operate until the next; and if, at that time you cut off all the leaves, it will effectually kill it.

Mr. Smith.—In answer to Mr. Stebbins's question, I will say that some few years since I spent a few days in Wisconsin. A friend of mine was clearing a piece of land for wheat that was covered with what they call "scrub timber," consisting of white oak and walnut; and they were digging it out invariably. They dug down twelve or fifteen inches, and cut off the roots. I asked the reason for that, and they said it was the only way they could clear the ground. They stated that they would grow there for a hundred years if they were not cut down low.

I will state that I use ashes, leached or unleached, on my land, and the result is to bring in white clover. I consider that I get great benefit from it.

Mr. Wetherell.—I was speaking to Professor Turner, one day, and I told him that I had heard that the hickory could not be transplanted and made to grow. He said, "I can show you one growing." I asked him how he managed to move it, and he said, "My men dug down a depth of twenty-two feet, to the end of the tap-root, and then the tree was removed to my yard, a large hole dug, and the root coiled and placed in that excavation." He showed me the tree, and it was growing. That is an illustration of the depth to which the tap-root of that particular tree penetrates.

I would say, also, that a friend of mine told me that he cut over a swamp the last of December or first of January—cut it smooth and close—and he never saw a sprout from a single bush or shrub. He said he had cut it frequently before, at other seasons of the year, and was troubled with sprouts; but in this instance, he never saw a single sprout. Yet this case does not come within the period that Mr. Perkins names. When I was a young man, engaged in clearing land, I remember very well, that where trees were cut in June or July, they would sprout luxuriantly, because I had the painful labor of going over and beating them off, before burning the brush.

Mr. Smith.—One case is brought particularly to my mind. Some few years ago, I purchased a piece of land of six acres, covered with an alder swamp, very thick, and some of them large enough to use for wood. I cleared that piece of ground in the latter part of December, and I never was so little troubled with sprouting as on that piece of land. That was an exceedingly cold time ; but whether this result was owing to the action of the frost on the roots, or to the time it was cut, or what, I never was satisfied. I cut them as low as I could.

Mr. Stebbins.—There are pasture lands in this vicinity for which neither plaster nor ashes will do anything. What shall we do with them ? They have been ploughed to death. The policy of the old farmers here was, when they cleared a piece of timber land, to burn it over, plough it, and rye it; and some of our pastures have been *ryed* and *ryed* until there is hardly a shadow of soil left. There is no vegetation on them, and no amount of ashes or plaster that you can put upon them will make vegetation there. There is another difficulty with our pastures—some of our farmers are in the habit of stocking too high. But there is another class who have run into the opposite extreme. I have seen the feed on some of these pastures knee-high all the season through, and in connection with the grass there has sprung up, within the last few years, a little knotty bush, almost as small as grass. There was none of that until within the last four or five years. I attribute that wholly to the grass not being fed down. The cattle won't touch that, either early in the spring or late in the fall. Pasture lands want to be fed off close all through the season.

Mr. Taft.—The gentleman [Mr. Stebbins] wants to know what he shall do with land that neither plaster nor ashes will help. We have, in the south part of Worcester County, quite a portion of territory that we call the "pine plains." That territory, I am told, was planted with corn by the Indians, and since then it has been *ryed* to death ; and we have come to the conclusion that the best we can do with it is to let it run up to wood.

White birch, pitch pine, and white pine grow there. I have in my mind now a piece of land that in 1833 was sold for five dollars an acre. Two years ago, I offered a man seventy-five dollars for an acre of it, which was mostly white pine, and he thought it was worth more. Last week, a piece of this land was sold for thirty dollars an acre, on which, since I was twenty years old, I have seen rye growing. I suggested that the purchaser paid rather a high price for it, but was told that he got it cheap. That is covered with pitch pine and white birch, which are worth six dollars a cord. We have come to the conclusion that that kind of land isn't worth anything for pasture, especially around certain localities, where our fences "winter-kill" badly.

A. F. ADAMS, of Fitchburg.—I have tried sowing new land for feed, in the spring and in the fall, and I like spring sowing much the best. I plough quite late, after I have done my fall work, and let it lie until about the middle of June. Then I put on a few loads of compost, and sow it with winter rye—about two bushels to the acre—and grass seed. It then comes into feed in August, when our pastures are most apt to fail, and when we need the feed much more than we do in the spring.

Mr. HOMER.—I would suggest to Mr. Stebbins that he try buckwheat on this land that has been exhausted with rye. Let him raise it for twenty years, and if he don't have as good a crop the twentieth year as he got the first, I shouldn't be willing to give much for his land. There will be a very nutritious crop of redtop following the buckwheat. I have a piece that has averaged me over ten bushels to the acre. I have a pasture containing altogether some fifty acres. There is some of the cowbane on it, and a little high laurel and hardhack; but wherever I have tried plaster, it has killed out those things. I will say, in regard to plaster, that the white, soft plaster is not worth much for me. Give me the strongest scented plaster. It may be the heaviest, but it will pay the best. Wherever you can produce white clover, if you will put on plenty of plaster, you can have good pastures.

Mr. STEBBINS.—I would like to inquire if there is any way to kill out moss without ploughing?

Dr. HARTWELL.—Compost manure or horse manure will kill it. It is an expensive way, but that will do it, and bring in white clover. It will also kill any other wild plant, if you will cut it down. It is as fatal to these wild plants as civilization is to the Indian,—just about as sure to kill.

Harrison Garfield, of Lee.—I have on my farm hardhack, and I have found that it gets so strong a hold that no grass will grow at all. It has formed a perfect mat, so that cattle cannot get through, where, ten years ago, there was a good pasture. I have practised mowing it seven or eight years, and cannot kill it in that way. Three years ago I commenced ploughing it up in September and October, pulling it out of the soil and throwing it upon the surface, and when it got dry, gathering it together and burning it; then I manured the land and cultivated it. It takes two pair of oxen to plough it. Its roots are jagged, and fill the whole surface of the earth. Cutting it down tends to spread the roots and make it grow thicker, so that we have been obliged to tear it out and change the character of the soil, by deep draining, to keep it out, after we had got it eradicated. I am fully persuaded that no cutting down, however close to the ground, will ever kill it. It may, possibly, do it in some places where the soil is lighter than ours.

Then, in relation to Canada thistles. They have been there for twelve years, and have been mowed every year, when the stalk was hollow; they have not been suffered to go to seed. Yet we do kill them by mowing. I have had them on my own lands and driven them off by mowing. But I think much depends on location and the nature of the soil, in regard to killing them off by cutting.

Prof. Agassiz.—I would like to inquire what plant it is that is called "hardhack?" In the eastern part of Massachusetts, it is the *spirea tomentosa*,—a small shrub, with a rose-colored flower. That certainly cannot be the plant described by the gentleman who has last spoken.

Mr. Anderson.—I have no doubt that I can kill the hardhack, or any vegetable that exists. It may be more difficult to kill on some grounds than on others. If the ground is too wet, I would ditch it thoroughly. I think there would be no difficulty in killing it, if kept well cut down. I have killed it, where it has been as thick as it could grow, by one cutting.

Mr. Garfield.—Many farmers have been obliged to tear it out of the ground, to get rid of it, satisfied that cutting it off would not do it. I was not alone in the experiment. I can cite many instances where it has been tried. We consider it the greatest nuisance we have. We prefer Canada thistles, altogether, to these things.

Mr. PERKINS.—There are two species of plants in our vicinity that we call "hardhack," but they are dissimilar in their blossoms. The plant alluded to here is neither of these two kinds, but is a plant that you will see growing in Lee, Lenox, Stockbridge, Lanesborough, and Pittsfield, on moist land. It grows up in a bush, and has yellow blossoms, with a leaf something like that of the sweet fern, in shape.

Mr. CLEMENT.—We had some of the Canada thistles in our pastures, and I felt considerably annoyed, for fear they would increase upon me, and set the men to cutting them off with the hoe, just below the surface, so as to be sure to get all the leaves out of the way. By adopting this method, we, in one season, very nearly eradicated them.

J. M. CRAFTS, of Whately.—I was particularly struck with the remark made by my friend, Mr. Stebbins, in reference to certain pasture lands upon which ashes would do no good. I don't know but it is so; but I have never yet seen land that could not be improved by ashes. It is true that some soils may contain potash to such an extent that mineral elements will not benefit them so extensively or so readily as others; but when a piece of land is denuded of all vegetation, from the very fact that the mineral elements have been exhausted, it shows a strange kind of logic to me, to say that they cannot be improved by the application of those same elements.

A question has been raised about eradicating black moss. I live in a neighborhood where there is an abundance of it. The land is cold and wet, and the consequence is that black moss is a great trouble to us. Now, as I have been engaged in the manufacture of pottery ware, I have had occasion to notice the effects of clay upon it. Dr. Hartwell said the way to eradicate black moss was by the use of manures. Now, we cannot afford to do any such thing. Where we grow tobacco for a living, to use manure upon our pastures would be entirely out of the question. Now, in digging the clay from the ground, it gets scattered over a portion of the old pasture that is covered by a complete mass of black moss; and I have noticed that there the black moss is killed, and good, sweet, nutritious grasses take its place. If ashes will have no effect on my friend Stebbins's pastures, I recommend him to use clay; perhaps that may be available. There are some clays that are perfectly dead or inert, and do not have any sensible effect upon the soil; but others appear to be impregnated with salts, and wherever that clay goes, good results follow. I believe that the application of such clay, fifteen or twenty loads to the acre, for a year or two, combined with the application of ashes, would make Mr. Stebbins's worthless pastures very valuable.

Dr. HARTWELL.—I said that stable manure would kill this moss, but it was very expensive. I did not recommend it.

Dr. W. SPEAR, of Greenfield.—I would like to ask about exterminating the white daisy, which injures our pastures and mowing land, more than the Canada thistle.

Mr. ANDERSON.—Sheep, I believe, will kill it.

Prof. AGASSIZ.—I know another way. I would not recommend it, but it has been very successful in my case. I have just an acre of land round my cottage at Nahant, which was white with this abominable weed. I have with this hand weeded out every root; there is not one white weed upon the place; it is a beautiful meadow now. I would say that it did not take so very long, as you might perhaps suppose. In three days I did it; I worked from early morning until night, for three days; and they were as thick as I have seen them anywhere.

Mr. TIDD.—I have been very much interested in the discussion that has taken place this afternoon, in relation to the renovation of our pastures. It is a subject that we ought to consider, and the best way that can be devised to do this ought to be resorted to. I coincide with a great deal that was said by the gentleman from Whately. Where pastures can be renovated without ploughing, we should all agree that that would be the better way; and where plaster can be applied, and is found effective, it is a very easy way of renovating land. There is a great deal of soil in the vicinity where I live, upon which it has been found very beneficial indeed. It has been used to a great extent on some of the mowing fields, and very beneficially. Some men have almost made their fortunes by it; that is, by going on to farms that have been run out, as it were, by cultivation, and applying plaster. I have in my mind several instances of that kind. I remember one gentleman in particular, who became possessed of a farm there a number of years ago; and the question arose in his mind how he should renovate his pastures. He had heard that plaster was one of the means to be used with effect, and he went to Boston, selected his plaster, and brought it home. It was so new an idea that he was ashamed to let his neighbors know what he had in his sleigh, and kept it covered up; but they found out what he had got, and what he was going to do with it, and they ridiculed him; but he went on with the operation, and spread it upon his hill-sides and upon his pastures. Very early in the season, his neighbors began to inquire "What has produced such an effect upon your pastures?" "Why, it is that *rock* that you ridiculed me for bringing up." This was in the town of Barre. This method, of course, spread very rapidly, and the land in that town is of the character that is benefitted very much by the use of plaster, and it has been of great advantage there; and so it has in the town where I reside. Still, there are some pastures that are not improved by plaster.

It has been stated here, that mowing brush below the leaves would be sure to eradicate it after a time. It may be so, but it strikes me that in some cases it would be an expensive way. It is very difficult to cut below the leaves of the low laurel, which grows round stones. It is next to impossible to do it. Here is the low laurel, and the little vines of "five-finger," and other weeds, upon a pasture so thick that there is but very little grass growing upon it. Now, I would ask, How can this pasture be renovated but by the plough? It seems to me that the only way, or, if not the only way, the easiest way, to renovate such a pasture is to put these weeds underneath by the plough, and either to cultivate or sow with rye and seed it, and let it be fed in that way. If it can be ploughed so as to turn the brush under and keep them under, perhaps the latter way would answer; but if it cannot, it strikes me the only way is to cultivate it until you do kill the brush.

I have, for a number of years, practised spreading the manure dropped by cattle, and it is practised to a considerable extent by the farmers in our vicinity. I consider that it pays well for the labor of doing it.

Mr. Bull.—I do not know much about pastures, for there is not a great deal of pasture land in Middlesex County. The people are engaged in the milk business quite extensively, and our farmers are therefore obliged to own pastures up in the country, especially up in New Hampshire. One of my neighbors, who had a pasture up there which had formerly been exceedingly valuable to him, but which, as he supposed, had been overstocked for two or three years, found that it began to fail and he did not know what to do with it. He consulted his neighbors, and was advised to stock it with sheep. He thought that would be the ruin of it, for the sheep is a close feeder, and if there was too little pasture before, how was there to be enough pasture for a flock of sheep in addition to his cows? But considering that sheep eat plants that cows reject, and considering also that perhaps those plants rejected by the cows were possessing the pasture, and so encroaching upon the better grasses which formerly fed the cows, he did put in a small flock of sheep, and to his great astonishment, his pasture improved. He pursued that method for several years, until that pasture was brought back to its pristine fertility, and fed the same number of cattle that he had formerly kept upon it. I throw out this hint for the consideration of the Board; not that I know anything about it, but because, if there be anything in it, it would be a very easy and profitable method of renovating pastures, inasmuch as you would stock your cattle and some sheep besides.

Mr. Tidd.—There are places where it is very difficult to stock with sheep, but where it can be done, I think it is a very effective and very profitable way. I recollect having a pasture once that was infected with hardhack, Johnswort, and a variety of noxious herbs of this kind; I put sheep in there, and it was but a very few years before they were all gone, and the clover was very luxuriant.

Mr. Perkins.—I know of no vegetable that will stand before sheep except brakes and Johnswort. In a neighboring town to mine, a man had a very good farm, that he kept stocked with sheep ten or fifteen years. We called his pastures *sheeped* to death. He sold his sheep, and those pastures were allowed to lie unstocked for two years; then he stocked with cattle, and his pastures were better than ever before.

The question comes up here in relation to the kind of grass which it is desirable to cultivate in pastures. Whitetop is not a profitable grass to grow in pastures. It does very well up to the fifteenth day of July, it then goes to seed, and from that time, or from the first of August, when it has dropped its seed, it will not keep any kind of stock any better than rye or oat straw after the seed has been thrashed out. Herdsgrass is not a desirable grass to be put into a permanent pasture; it runs out there. Redtop is the most desirable of the grasses to cultivate in pastures; it holds its vitality through the better part of the season, so that the stock keep in good condition until the time of snow-fall. White clover is a very desirable pasture plant, and in a clay soil, it is very likely to predominate. Lime, ashes, and plaster all have a tendency to increase the growth of clover. Now, I wish to advance the idea that white clover is the best quality of feed for anything that gives milk. I believe you can produce a better quality of butter and cheese from white clover than from any other grass.

Prof. Agassiz.—I would make a remark which I believe bears upon a point which is not fully taken into consideration. I am struck with the different views presented by Mr. Perkins, on so many points, from those of other gentlemen. I have no doubt it arises from the fact, that his land is over a thousand feet above tide water. A difference of eleven hundred feet, in a country like this, must make a very marked difference in the general character of the vegetation, and I think that difference ought to be kept in view. I know positively, that in Switzerland, where Alpine pasturage is very extensively carried on, there is a complete difference in the vegetation upon which the cattle are sustained at different heights. In fact, cattle which are raised in the Alps are raised upon plants which they never get as food in the lower part of the same country; and there is on that account a very marked difference both in the size of the cattle and in their character as producers. I would like, therefore, to have the lay of the land given, with reference to its height above the level of the sea, when any observations are made concerning its fertility or the character of its vegetation, because, no doubt, there must be a marked difference.

Wm. Elliot, of Greenfield.—I would like to inquire if sheep will eat Canada thistles? I have heard that they would eat them in preference to good hay.

Mr. Perkins.—There are no Canada thistles in my pastures, and I cannot say how that is; but I know that if sheep are driven through a lot where there are Canada thistles, they will nip off the blossoms as they go along.

The Chairman.—I think it must be apparent that the methods of improving pasture land differ in different localities, and that what is good for one place is not good for another. Mr. Anderson has presented his method, which seems to have been satisfactory so far as his farm is concerned; and others have presented theirs. Possibly the best view to take of it would be that every man must be governed by the nature of the land which he owns. I have seen pasture lands upon which there was no grass, ploughed deep, dressed with three or four hundred pounds of bone manure to the acre, and seeded pretty successfully—not very; it was a long time before the sod was made satisfactory to the cattle. I have seen a piece of high pasture land restored by simply hauling upon it the muck from an adjoining mud-hole. I have seen a piece of clay land, where grass did not grow at all, brought into a most luxuriant growth of herdsgrass and redtop, by simply carting sand upon it, to the depth of two or three inches, and leaving it to the action of the frosts, the rains and the heat. It has occurred to me that, possibly, we had better, in the first place, adopt Mr. Anderson's rule, and not interfere with the grasses already growing in our pastures. You cannot put any one grass, or two grasses, or three grasses, into the best pasture land, that will entirely satisfy the cattle, the sheep and the horses that feed upon it; they want a hundred different varieties, some of them more. Therefore I think it would be well to adopt the rule not to interfere with the natural growth of grasses upon the piece of pasture land which you intend to renovate. Having laid down that rule, you will then, of course, remove all noxious weeds and shrubs. That must be done in one way in one place, and in another place in another way. There is no doubt that constant cutting will destroy these things. After having accomplished that, you will then proceed to apply to that land whatever is necessary for its renovation. I have often thought that some sort of an instrument might be invented, which would run under the sod—a sort of plough that would open and lighten the soil without destroying the sod at all. I have often seen a piece of pasture roused up in that way by a simple accident; and an accident will sometimes furnish a rule for you to adopt. But at any rate, after you have made up your mind that the natural grass is all you want to improve upon, and have established the fact that you can remove all noxious weeds growing there, in one way or another, then the question is, what you will apply. I remember that the Secretary of the State Board of Agriculture once owned, in the town of Rowley, a piece of land upon which I suppose that almost every noxious plant that has been spoken of here grew naturally. The land was low and flat, and you could find as much hardhack as you wanted; you could find Johnswort, if you desired it; you could find Canada thistles if you were very eager for them, and almost everything. It was low, as I have said, and it was evident there was underneath a considerable quantity of water. What would you do with such a piece of land as that? In the first place, let out the water; and, in the next place, if there is anything that can be applied to it that will bring it into good grass, it is sand. Whether it is a mechanical or chemical process I do not know, but such a piece of land would be exceedingly benefitted by sand.

You may find that plaster will do in some cases, but if plaster fails, there is no reason to be discouraged. You can try ashes, to a certain extent, with hen manure or without. Your object should be to ascertain what kind of manure will effect your purpose, and then apply it. But you have forgotten one of the most important parts of this whole question, and that is, that you cannot stock one pasture with the same kind of animals for a series of years, and not have that pasture suffer. Is not that so? I have heard that the sheep pastures in Berkshire entirely failed at one time, and the farmers were obliged to sell their sheep because their pastures would not keep them. But the instant the sheep were gone, the cattle came in, and they found feed enough. So the farmers of Berkshire would tell you that sheep will kill a pasture, and cattle improve it. But the simple fact was that the sheep had taken from those pastures, for a series of years, all the grass they were willing to eat, and they had yielded manure enough to draw out other grasses for other animals. I would, then, change the class of animals from time to time. The pastures would last much longer, would be more nutritious to the animals fed upon them, and, in the end, this great difficulty of the failure of pasture lands, would be, to a certain extent, remedied.

I do not say that all lands are fit for pastures, because they are not. There is land in the Commonwealth which is not fit for pasture land; but if you have got a piece of land which is really fit for pasture land, one or the other of the processes which I have suggested will unquestionably keep it in good condition.

Mr. ANDERSON.—I don't know but it may be necessary, in the course of ages, to make this change; but pastures that we are now feeding have carried through the same kind of stock for sixty years, and are now worth double what they were. We have one pasture that has been under grass eighty years, and there has been no other kind of stock upon it during that time but neat cattle. It has been over thirty years since I have observed this system, and our pastures have been improving all the while, and our stock improving in proportion.

Prof. AGASSIZ.—I know that in Switzerland, there are pastures where cattle have been raised for several years, without any kind of improvement of the natural feed. I do not maintain that those lands are used to the best advantage, either. I do not know but they might be stocked to a much greater extent than they are.

The CHAIRMAN.—We have been talking about renovating pasture lands. There would be no occasion for renovating such pasture lands at all, nor those to which Mr. Anderson has referred.

The discussion here terminated.

Mr. PERKINS, in behalf of the committee appointed to consider the question of the establishment of the Agricultural College, stated that the committee had consulted together, in relation to the matter, and would request to be allowed to delay their report until the annual meeting in January. The request was granted.

Adjourned to seven and a half o'clock.

EVENING SESSION.—Met at seven and a half o'clock. Dr. Loring in the chair. The Chairman stated to the audience that Prof. Agassiz, who had been announced as the lecturer of the evening, had kindly yielded it to Prof. Rogers, who was obliged to return to the city in the morning. They would not, however, be deprived of the pleasure of hearing Prof. Agassiz, who would speak the next evening, and when they had heard both these gentlemen, he thought they would find it difficult to decide which had gratified them most.

ADDRESS OF PROF. WILLIAM B. ROGERS.

Thanking you, sir, for the very complimentary manner in which you have introduced me to this audience, and most especially for a form of compliment in which I am associated with one who is distinguished, not only on this continent, but throughout the world and will be forever distinguished in the history of science as its promoter and cultivator in an eminent degree,—thanking you for this compliment, and thanking the Board for the opportunity they have afforded me of addressing them on this occasion, I must at the same time assure you that I come before you entirely free from the presumption that I am able to instruct any member of the Board or any intelligent farmer in the Commonwealth, in the practical business of agriculture. I have, it is true, in connection with my studies and my explorations in geology and in chemical science, been brought continually in contact with the problems of agriculture, and have learned long since to understand, not only their immense magnitude and importance, but their peculiar complexity and difficulty ; and I have, therefore, proposed to myself this evening, in a somewhat rambling way, to present such ideas as have occurred to me in relation, first, to the connection which subsists between agriculture and positive science ; and, secondly, to illustrate my views on this subject by reference to one or two of the larger and more comprehensive relationships which I have been enabled to trace, to some extent, throughout the length and breadth of that portion of the Union which lies between the Atlantic and the Mississippi Valley, in regard to the soils, and the rocks with which those soils are associated.

The day has long since passed when the association of agriculture, in its largest and in its most advantageous practical forms, with the principles of science, even in their more abstract modes of development, was looked upon as a mere dream of the enthusiast ; because the instructed men of all parts of the civilized world at this day recognize that science, exact science, is but the sure application of common sense to the phenomena by which we are surrounded. You have all, doubtless, heard the story of the dervise in the desert and the lost camel, showing so strikingly the truth of that long celebrated phrase of the illustrious Bacon, in which he speaks of man as the minister and interpreter of nature. The dervise, in his travel across the desert, met with a party of merchants who had lost their camel. He accosted them—"Friends, have you not lost your camel?" "Yes." "Was it not blind in one eye?" "Yes." "Was it not lame in one of the fore legs?" "Yes." "Had it not lost one of its front teeth?" "Yes." "Was it not laden with corn and honey?" "Yes. Dervise, show us our camel!" The answer was, "I have not seen your camel. I know not where the animal may have wandered." Indignant and enraged, they dragged the dervise before a justice, and his simple, satisfactory plea was this: "I have not seen the lost camel, but I saw the prints of the animal on the sands. I saw that there was a failure in one of the steps, at each successive impression of his progress. I saw that the grass that had been bitten where the scant herbage grew, always presented a little tuft, uncropped in the centre. I saw by the direction of the bite that the head had been turned obliquely; and the busy ants on one side and the clustering bees on the other, told me what was the burden of the animal. Thus, then, I recognized the path of the camel and his peculiarities; and by the simple application of the means of observation with which Providence has endowed me, and the use of my own simple common sense, I interpreted the phenomena and made the discovery."

Such is the practical application of the intellect of man in the interpretation of nature, in all the departments in which human discovery has been advanced. There is nothing special, there is nothing peculiar, there is nothing mysterious in science. It is but the multiplied, carefully renewed observation of the facts that abound everywhere and at all times around us, and the application of common sense, the ordinary principles of right reasoning, to those facts; enabling us to evolve the grandest and most magnificent laws, whether those laws be such as concern the dust that we tread beneath our feet, or such as link together the starry suns, and the myriads of planets that encircle them. Then agriculture, as other branches of practical science, requires the determination of our facts of observation in the exactest form, and the proper induction of laws or principles through the collation of those facts. But herein lies the great and peculiar difficulty of agriculture as a science. I know that some of my agricultural friends have, in former times, been inclined to smile at me when I have said, as I am still prepared to repeat, that what we want in agriculture, quite as much, if not more, than anything else, are facts,—true facts,—facts in which the most exact and precise determination is made, not only of the result, but of all the conditions by which that result has been brought about. It is very common to distinguish, in ordinary conversation upon subjects of this kind, between the philosophical or theoretical man, and the man of facts; but the true philosopher in agriculture, as in everything else, is the man who is master of the largest number of the most precise and important observations; and until he has secured the mastery of this great group of facts, he cannot philosophize. Now, the signal difficulty attending investigations in agriculture,—(pardon me for my seeming presumption, in speaking upon a subject, with which you, sir, and the larger part of my audience, are so much more familiar in detail than I,)—consists in the great diversity, and, in many respects, peculiar obscurity of the facts.

Let us take an illustration now, in reference simply to the phenomena of soil. We all know well that there was a time when not only in many parts of Europe, but largely throughout the United States, the most sanguine, and, I may now say, the most extravagant anticipations were formed from the application of the doctrines of Liebig and other chemists to the affairs of agriculture. Far be it from me in any degree to disparage the labors of this illustrious chemist and his fellow-workers in the field; but the question has not unfrequently been presented to me whether, by a knowledge of the composition of the soil, and a knowledge of the composition of the plants that are grown upon the soil, we cannot surely reach a successful agricultural method. My answer would be, no. The composition of the plants and the composition of the soil are only two of the correlative facts. We must know them, but there are many other things that we must know, which are equally essential to be known. The soil may be of a certain composition, and yet the ingredients of that soil may be in such a state of mechanical aggregation as to be scarcely at all available to the absorptive apparatus of the plant. The conditions of atmosphere, of moisture, and of temperature, affected always by the character of the soil as to its mechanical composition, will have a most marked and sometimes entirely controlling influence in regard to the production of vegetable growth. So important is this, that, some twenty years ago, I undertook, in association with my youngest brother, a very prolonged series of investigations, having an agricultural object in view, with the purpose of ascertaining somewhat numerically and with necessary exactness, the degree to which the solubility, and therefore the availableness, of certain mineral materials was affected by the reduction of those substances to a state of extremely fine comminution, and here are some of the results.

A mass of granite, which yields to rain water or to distilled water an entirely imperceptible trace of any of its ingredients by contact, will, when it has been reduced by a properly continued process of reduction, to an impalpable powder,—even finer in these experiments than wheaten flour,—at once begin to suffer decomposition by the contact of pure water; so much so, that a little of this powder placed in a paper funnel, and then exposed to the dripping, for a short time, of perfectly pure water passing through it, will yield up a sufficient amount of its potash, its soda, and of its lime, to make it perfectly easy to demonstrate their presence in the liquid when received in a vessel beneath, by the appropriate tests. And so a mass of felspar, a mass of hornblende, a mass of soapstone, or a mass of the hardest sienite, when thus reduced to a very fine condition of comminution will be found instantly to show the decomposing action of the infiltrating water; and when that water is charged with carbonic acid, which it must be when it descends in rain drops through the atmosphere, drinking up this gas as it passes down, and still more as it sinks through the earth, it has a double, even a tenfold power of solution in regard to these various materials. Now see the difference in another case. We take an ordinary mass of bone-earth, which has been broken into the form of bone meal, by the common process of Bogardus's mill; we know that to a certain extent, it is soluble by the infiltrating water that passes through it. But let this material be reduced, as it can be, in a new form of mill machinery which is at work in the vicinity of Boston, to an impalpable dust, and it becomes quite soluble, so that the water passing through it drinks it up in large quantities, and would furnish it most liberally to the roots of living plants. These, then, are simple illustrations of the enormous influence exercised by mere mechanical aggregation on the value of soils. Of course, this is no novelty to those who hear me; but it seems to me that the importance of the fact has not been duly weighed or sufficiently recognized in practical agriculture. I might in like manner illustrate the influence of the color of soils as affecting their capacity for absorbing the solar rays, and in the same connection speak of the relative powers of different soils as to the conduction and retention of heat, and I might dwell on the still more important diversities which depend on the permeability of soils to moisture, and their power of retaining it when received; but I must pass over these leading considerations to a fact of special interest less generally known, which was first clearly established a few years since by the great agricultural chemist Boussingualt. This able observer ascertained that in soils containing much organic matter intimately blended in the mass, there exists and is continually evolved a marked amount of carbonic acid in the gaseous state. He found that the air occupying the interstices of the soil, forming often one-half of the entire volume, was not the common atmospheric air of the surface, but that it was air impregnated with carbonic acid, amounting in the case of certain deep organic loams to a considerable percentage of the whole bulk.

Now, carbonic acid, you know, is one of the materials which contribute directly to the nourishment of plants, the substance which chiefly furnishes the carbon, building up, as it were, the solid framework of the vegetable structure, while the oxygen previously combined with the carbon in the gas, is, in the processes of the vital economy, exhaled again into the atmosphere. Now, observe what an important element here is, which yet is not detected by the ordinary analysis of the soil. The soil is dried, the water is expelled, the gases it held are freed and escape, and the soil is then analyzed as a dry, solid material, leaving us in ignorance of one of its most important characters —the capacity it possesses through the chemical change of its organic contents of furnishing a continual supply of this most valuable form of the food of plants.

Observe further, that not only does the carbonic acid, thus distributed throughout such rich vegetable loams, convey directly its important nutritious matter to the growing plant, but it is the most powerful solvent which nature furnishes us, under these conditions, for the calcareous compounds, and for the various alkaline compounds contained in the granules of subdivided rocks; so that the water passed through such soil becomes freighted with carbonic acid, and thus has a powerful dissolving action which it did not possess when it descended in the form of rain to strike upon the surface of the ground. All these various conditions, then, require to be taken into account, and they must be in each particular case precisely determined, otherwise we have not the facts. But when we do obtain all the facts, then we are in a condition well prepared to reason upon them, and to deduce our general laws and our practical rules, suggested by those generalizations.

But, further than this: this knowledge of the soil, this *terra firma* of the science and practice of agriculture does not constitute its whole. We have to deal in agriculture, as we all know, with living beings. We have all the physiological laws relating to their development and growth, their nutrition and various functions, to consider. We have in agriculture much of the mystery, much of the difficulty and complication in our problems which belong to the practice of the physician. We have added to the requisitions of the most profound chemical analysis and the largest generalizations in chemical science, a demand for the facts and laws that belong to physiology, embracing all that is known of the functions of living beings, in their relations to external agencies of a chemical and mechanical nature. What wonder, then, is it, that agriculture (pardon me for saying it,) is a science still in its infancy, when we know well that medicine, as a science, is recognized by its greatest and most illustrious lights, as at best, only in its nonage; and when we conceive of the vast difficulties and the complexities of the problems that belong to it! Yet, we have this to console us—that while we may not be able, for want of a thorough knowledge of all the facts, and perhaps of a complete and perfect knowledge of very many of them, to draw the broadest generalizations, such has been the multiplication of exact inquiries in connection with agricultural phenomena and the relations of chemistry and physiology to this subject of late years, that we are in a condition to deduce many partial laws, and thus to avail ourselves largely in practice of the lights which science, in its various forms of inquiry, has been able to shed upon the subject. Does the view that has been presented discourage us from the cultivation of science in its relations to agriculture? Surely not. It only shows us the more how necessary science is. And let me here say, that one of the greatest advantages that can be obtained from Schools of Agriculture, in their most enlarged and comprehensive shape,—one of the greatest, if not the most important result for the future progress of the science and the art, is this: that the training which is enforced by the study of the exact sciences, in the class-room, in the laboratory, and among the various phenomena and objects which the naturalist exhibits to the student, is the only sure process by which he can be qualified for the exact determination of the facts of agriculture, and for deducing from them scientific laws, and rules for practice.

See how it has been with meteorology! Our fathers, for how many generations it is not necessary to say, had been piling up their observations, so that a library might be filled, merely by the numbers they had jotted down as records of temperature and other phenomena of the weather. Yet nearly the whole of that vast mass of what used to be called facts has been found to be almost valueless for purposes of generalization, simply because the observations were not made in the right way or of the right kind; they were not comparable one with another; the instruments themselves were not reliable, and there was no standard with which they were compared. Thus, in spite of the labor of so many thousand observers, in recording the coldness of winters and the warmth of summers, and the varying pressure of the air, no sufficient data were collected for determining truly the distribution of temperature, pressure and other elements of climate, and it is only of late years that, through the adoption of precise methods of observation introduced by science, a sure progress has been made in unfolding the laws of these varying influences and phenomena. Habits of exact observation, according to scientific methods, aiming to approach the nicety and precision of mathematical determination,—these are the results of the kind of schooling which a student in an agricultural college ought to have, and with which, doubtless, he will be furnished, when such an institution shall be duly organized, within the boundaries of this Commonwealth.

I propose, gentlemen, to say a few words in regard to certain general aspects of the soil, as related to the rocks of the United States,—a very broad subject it must be confessed. But before entering on this topic definitely, it may interest my audience a little if I show them two objects which I have before me, as illustrating how the culture of the soil connects itself directly with chemical inquiries, and of what an interesting character they are. Everybody knows, of course, what clay is. It is not a simple substance. It usually consists of a portion of silica, in other words, pure flint, in a state of fine subdivision, and alumina, or pure clay. Now this pure clay consists in a very large proportion of a peculiar metal called aluminium, so that in this sense, we all have metallic mines under our feet, and with every ploughshare, we are turning up large quantities of this metallic matter. Here is the metal. [Exhibiting a small piece of aluminium.] This is the metal which is the basis of clay. A pure metal, beautifully resonant, [striking it upon the desk,] hard, silver-like in its lustre, and extremely light,—a little more than two and a half times the weight of the same bulk of water. Many of you have, doubtless, seen it, as it is beginning to be used to a considerable extent, in the manufacture of ornaments. It exists as a very large ingredient of the crust of the earth. The quantity of iron deposited throughout the various strata of the globe is to be looked upon as utterly insignificant in comparison with the quantity of this metal; but it is only of late years that it has been obtained from the rock or earth in which it exists as a *white* oxide clay, just as iron is found as a *red* oxide, in the common ores of that metal. Such, then, is a part of the chemistry of your soil.

Here is another metal, still more curious. It is a very light wire. Every one knows the substance called magnesia. Most persons who have the care of a nursery, understand some of its uses. Now magnesia is nothing more than the white rust of this metal; and magnesia is one of the most abundant substances in the rocky structure of the earth. Many parts of the Vermont range of hills consist largely of magnesian slates, and it is, moreover, a large ingredient of many limestone formations, occupying extensive tracts in this and other countries. This light metal, as you see, is capable of being made into wire. Now, it has a very curious property, which I shall try to show you. [The professor here put the wire into the flame of a common lamp, and it burnt with great brilliancy.] You perceive it burns with a very vivid combustion. The intense brilliancy of the flame is due to the suspended particles of the volatilized metal and its oxide produced by the combustion. This white product which you see, is common calcined magnesia. The process was simply this: the rusting, which is naturally very slow, was here carried on with great rapidity, so as to combine the oxygen in the atmosphere with this metal, and thus to reproduce the magnesia from which the metal has been actually manufactured. This, then, is another illustration of what we have chemically in the soil.

I have introduced these two experiments, perhaps a little out of place, but they serve to show how impossible it is to investigate one department of physical science, independently of the rest—how entirely reciprocal and intermingled in their laws are all the provinces of nature and all the parts of each. Not a star in the visible heavens but sends its light to every other star, and is in return the recipient of radiance from all the rest.

In the course of my various explorations of the geology of portions of the United States, especially of the Middle and some of the Southern States, I had particular occasion to observe the relations of the soil to the subjacent rocks. I know that in speaking to the farmers of this region of Massachusetts about the relations of the soil in other parts of the country, they will not consider that I am broaching a subject unfitting the occasion, for we are students of the whole subject, in its largest comprehensiveness and extent.

Now, it will be observed at once that there is a character which marks the surface material of the New England States, and of the Northern and North-Western States generally, which is quite peculiar to them as compared with the States lying further to the south. It is this: that over a very large part of this northern area, the soil is not at all determined by the subjacent rock, because the surface is covered up, sometimes to a very great depth, with the debris of the rocky materials transported from a distant region, and the material which constitutes the soil is such, as, for the most part, does not exist in its original form in the rocky structure which lies beneath. Therefore the study of the rocks of a large part of such a territory is a matter of comparatively little importance; but the study of the composition of this drift material,—this gravel, sand and clay,—which constitutes the really available portion of the surface in many districts of the north, is of course essential to the purposes of agriculture, as it is essential to the generalizations of the scientific geologist. But when we proceed to certain sections of the south, we pass beyond the limits of this great northern drift, which, either through the action of glaciers, or of vast moving masses of water, has been swept over so great a portion of the northern hemisphere. When we pass south a certain distance—for example, a little south of the northern limit of Pennsylvania,—we find that this drift covering has become very thin, and soon we find that it has entirely disappeared. From this, onward, the soil in general, through a vast district of country, has been formed by the disintegration of the subjacent rocks and has its mineral characters determined by the nature of these rocks. Of course, in this remark I do not include the alluvial soil of the valleys, some of which has been transported from northern regions,—for instance, along the northern course of the Susquehannah,—but the main soil of the uplands, and much of that which has been deposited as alluvion is derived from the rocky materials that occupy the very surface of the contiguous land.

Let us now consider some of those great belts of soil thus deriving their materials and qualities from the contiguous geological formations. Commencing our observations, we will suppose; with Long Island and New Jersey, we extend our view along that broad Atlantic plain, having the ocean on its eastern margin, washing it continually with its wearing ripples, and reaching towards the west and north-west as far as the falls of the rivers, where stand Trenton, Philadelphia, Baltimore, Washington, Richmond and Petersburg, curiously enough, all located just at the margin where this great Atlantic plain ceases, and where the broad belt of granite and other so-called primary rocks begins to make its appearance. Now, throughout all this lower and comparatively level country, we have various sandy and loamy soils, composed chiefly of the marine deposits of which the entire region is made up. Beneath the surface in a large portion of the vast area to which I am referring are to be found those rich resources which under improved forms of human activity and organized industry are destined ere long to transform the wasted fields into a garden of beautiful productiveness. The treasures are the beds of shell marl accumulated in the ancient sea and stored up beneath the soil to serve as a perpetual source of renovation and fertility.

The tertiary deposits of shells, sometimes of very great thickness, showing themselves along the margins of rivers, and in the ravines where they are deep enough, and found in all directions in the interior, furnish to the land large quantities of carbonate of lime; and associated with this the remains of organic matter, vegetable and animal, deposited at the same time, materials which when dug up and spread over the sands and clays, which are seemingly sterile on the surface, enrich them in many cases to a degree of exuberant fertility.

Let me now give a little illustration of what may here be seen in reference to the chemistry of the soil. There is one district of the tertiary region, north-east of Fredericksburg, celebrated now in the history of this war, a part of the peninsula called the Northern Neck, between the Potomac and the Rappahannock,—where there are extensive localities destitute of shell marl, although it once existed in them in enormous quantity. There, the farmer digging with a view of finding this precious material for manuring his fields, comes upon a mass of clay and sand, sour to the taste and having the smell of sulphur, and which, when applied to the soil under ordinary circumstances, produces a poisonous instead of a beneficial effect. Look at this clay or sand, and you will see that it contains no shells. They could not exist in it, but would be dissolved out and removed by the acid which impregnates the mass. But instead of the shells you will see cavities dispersed in every direction through the clay and sand, which a little observation will show to be what we might call the spectres of departed shells. In other words, they are the hollow moulds left by the shells which once abounded in the mass. But what has become of the shells? Dig down twenty, thirty feet deeper, and you reach a stratum of clay;

and this clay is studded all over, penetrated through in all directions with beautiful crystals of gypsum, in the form that mineralogists call selenite. The history of the whole change is at once revealed. The acid that still lingers in the upper clays, is sulphuric acid in a very diluted form. The whole mass of this clay has been slowly infiltrated from above by this diluted acid, which has dissolved out all the shelly matter, forming plaster of Paris from the carbonate of lime, which being arrested by the impenetrable bed of clay below, has formed the crystals of gypsum there. The farmer who has learned this history knows where to find the gypsum deposit. When he discovers the beds of clay from which the shells have been dissolved, he feels pretty sure that some twenty or thirty feet lower down he will find what is perhaps more valuable for his grass land than the original marl would have been, for he knows that in this region nature has manufactured the gypsum through the destruction of the shells.

We pass next to the belt lying west of this, in Pennsylvania, New Jersey, Virginia, the Carolinas, and Georgia, and we come upon the granites and gneissoid and slaty rocks, quite analogous to those which we have here in the central and north-western sections of New England. But in the region referred to, these rocks have been decomposed to an extraordinary extent. The soil there is nothing more, as it were, than effete rock,—the residuum left by the decomposition of the strata beneath. There has been no soil transported from other districts and spread over the surface. Therefore the study of the character of the rock gives, in a large degree, a clue to the character of the soil. So deep has been this process of decomposition, through the slow agency of rain descending upon the surface and the oxygen of the atmosphere attacking the various metallic compounds, that in many places where the apprehension was felt that enormous rock cuttings would become necessary in the construction of railroads, it has proved that the pick and spade were all that was required; and yet, so free from violence has been the change that the very structure of the mica-slates and the talc-slates is perfectly preserved. You may walk through a deep cut in one of those railroads, where the wall may be as much as sixty or seventy feet high on either side, and you will think you see solid rock, consisting of colored bands of mica-slate and talc-slate, with occasionally interspersed veins of quartz, the whole succession of beds steeply inclined, and thereby admitting more freely the decomposing agencies from the surface. Compact as the mass seems, it crumbles at a touch. These rocks are thus forming soil continually. The decomposed mass still contains some lime, some potash, and other valuable materials appropriate to soils, and is ready to deliver them up for the use of growing vegetables, whenever opportunity may be presented. We may regard the mass of softened rock, as having, to a great extent, been leached out, by the action of rain-water, and thus largely deprived of its lime and other soluble ingredients. Now, it is an important remark, in connection with this change, that the lime and the soda and the potash belonging to these rocky matters in their original solid aggregation, may be looked upon as cementing materials, and that the moment you separate these from the rocky substance, you break up the cohesion of its parts, and, as in the case of granite, it tumbles down in earthy particles, forming a white clay, mixed with the quartz and mica which remain, comparatively unchanged by the action of these agents.

Advancing a stage further towards the west, we come upon a continuation of our Vermont range, the Green Mountains, which, with very little interruption, run down as far as the middle of Western Georgia. This mountain belt may be traced, indeed, in geological continuity, from the banks of the St. Lawrence, through that portion of Canada which is contiguous, along through Vermont, through New York,—constituting the Highlands,—through New Jersey,—having the same name,—through Pennsylvania, under the name of the South Mountains, until it comes to the grandly classic region of Harper's Ferry, where it takes the name of the Blue Ridge, and continued in south-westerly course forms the great backbone of the central portion of Virginia; whence it passes out to form the Iron and Smoky Mountains of North Carolina, whose grand summits tower even many hundred feet above Mount Washington itself; thence, prolonged still further; it declines, and is lost about the centre of the line of division between Georgia and Alabama. Here is a great range of rocky materials, in many respects analogous throughout its whole course, and associated with soils derived from the decomposition and having analogous characters. On the west of this great mountain range, in Vermont and in New Jersey, and again in Pennsylvania, Virginia, North Carolina, East Tennesee, and Alabama, we have one grand continuous belt of formations, perhaps one of the most superb agricultural and mineral regions of the habitable globe; a belt overlooked on either side by mountains, prolonging itself through a distance of more than a thousand miles, and covered from end to end with limestone rock, and furnishing all the resources of a limestone region in its springs, its metallic ores, its grass-producing soils, and the rounded outlines of its topography. And then, when we pass still further west and north, we encounter ranges of slate and sandstone and calcareous rocks, in a parallel succession of lofty hills and deep valleys, abounding in useful ores, and furnishing a diversity of soils, corresponding to the strata from which they are replenished. Beyond this rugged belt of the Appalachians we reach the margin of the far-extending coal measures, made up of sandy, slaty, marly, and calcareous strata, interleaved throughout with vast sheets of coal and covered with a soil springing directly from these materials.

Such, on a great scale, are the facts which illustrate the intimate association, throughout wide regions, of the soils, with the rocks or other deposits which lie beneath or around them; and they clearly show, that in all future migrations in that direction, for the extension of American enterprise and the development of American industry, under more happy auspices, a knowledge of the geology of the country will furnish the best clue to the fundamental facts connected with its agriculture.

THIRD DAY.

Morning Session.—Met at ten o'clock. Paoli Lathrop, of South Hadley, was elected President, *pro tem.*

The first subject assigned for discussion was

CATTLE HUSBANDRY.

The Chairman.—I will say that I do not think there is any particular breed of cattle that is best for all places and climates. A man who is selecting cattle should select the best animals for breeding that he can find, without much regard to cost, with reference to his situation,—according to his soils and his means of feed. I would not advise any man who is going to breed cattle to go into the expense of buying high-bred cattle unless he expects to take care of them. No man can afford to keep his cattle, hogs, and sheep, unless he keeps them constantly growing. There are many of our farmers who commence the winter with a herd of cattle, feed out the whole of their hay and grain, and in the spring, their cattle are worth no more than they were in the fall. Now, if they would add to their feed and keep them growing, they would gain something; if they will not do this, they will get nothing for their feed but the manure; and from poor cattle, the manure is as much poorer as the cattle are poorer.

Dr. LORING.—The subject as presented to the meeting is somewhat novel in its phraseology, and it was so presented by the committee for the express purpose of allowing a large latitude of debate. You will observe that nothing is said about breeds, but the topic is intended to include all those classes of cattle that have, to a certain extent, become acclimated, and have become almost a distinct breed by themselves in certain localities in New England.

I suppose that one important point in the discussion would be the most valuable class of animals for New England farming purposes. It was very properly remarked at the opening of the meeting, that there is no one distinct and definite breed of animals universally adapted to New England agriculture. We have great diversity of soil and climate here. We have pastures of every description; high, hilly pastures, covered with short, sweet feed, and the luxuriant pastures of our river valleys. We find these various kinds of soil and these pastures in almost every State. The State of Maine, including a very large territory, has almost as great a variety of feed in it as all the rest of New England. There is as much difference between the feed along the valley of the Aroostook and the Kennebeck as there is between the valley of the Kennebeck and the Connecticut. There is as much difference between the pastures of the northern part of that State, and the pastures about Portland and the southern part of the State as there is between the pastures of Essex and Franklin Counties. So of New Hampshire; so of Vermont; so of Massachusetts; and so of Connecticut and Rhode Island. It must be evident, then, that the same rule holds good with regard to cattle here that does in many parts of

Europe. The traveller through Switzerland is sometimes astonished to find that the mere boundary between two cantons will make as much distinction in the cattle to be found in those two cantons as if that dividing line were a thousand miles wide. It is owing partly to the fact, that for a long series of years the cattle planted upon these various sections of Switzerland have established for themselves a distinct identity, and adapted themselves to the special agricultural peculiarities of the cantons in which they are produced. Now, the same law, of course, applies to New England; and when I hear any gentleman advocating any distinct breed as adapted to all New England, I have only to point him to that country, where they have been planted, and where they have established distinct families, adapted to the peculiarities of soil and climate in which they live.

I suppose that in New England, especially, the dairy is about the most important point to which the breeding of cattle can be devoted. I think a dairy cow, a cow adapted chiefly to the purpose of producing the most butter and cheese, or milk, if you are near a milk market, from the least amount of food, is, in the long run, the best cow for a New England farmer to own. I have no doubt that there are certain sections of the States, perhaps, of Massachusetts, in which large, heavy cattle can be raised to profit. There are unquestionably certain sections where butter and cheese especially are manufactured, where it is an object to the farmer to reduce his feed, with due regard to thrift, to that point which will most economically carry a cow through the vacation of winter,—that is, from the end of the dairy in autumn to the beginning of the dairy in spring,—and in those sections, larger-sized cattle are advantageous. There are, therefore, certain sections in which the heavier animals can be reared with profit;—large milkers, beginning in the middle of May, and going on until the last of feed in autumn, producing a great quantity of milk, which are profitable cows to the farmer, and which can be wintered economically upon the rough fodder which grows so abundantly in many parts of this State. That is one branch of farming that is unquestionably attended with profit. It enables the farmer to furnish himself with manure in winter, and at the same time it furnishes him with an opportunity, in case of accident to such a dairy cow as that, to convert her into an abundance of beef during the next season following.

I make these remarks because I know that a great many farmers in the Commonwealth pursue that branch of business, with that class of cattle, to advantage. How many herds of cattle we know of in this valley of the description I have spoken of, one side of which commenced with the best blood to be found either in this country or in Europe, properly crossed upon the best animals here, until at last they have established themselves, and have brought themselves up to a type of animal which is entirely worthy of the best breeder of the best animals in England or anywhere else. They find no place in the Herd Book; they have not sprung from any royal family; I grant that on their mother's side they have nothing to boast of, except that their ancestors were pretty good cattle; but on their father's side they get to the fountain-head, and by years of breeding in that way, they have really established for themselves a type adapted to this soil and climate, and a type which I am almost inclined to say, and I don't know but I might say with truth, better adapted to the soil and climate in which they have grown up, than any imported animals we can conceive of, considering the fact that our soil and climate differ so materially from those of any other country where herds of animals of that description are raised. They are acclimated, they are almost indigenous, they are natives, they know exactly what they are to meet with in winter, they understand our pastures in summer; and they have that kind of bone and muscle and digestive organs, and that organization of heart and lungs, which make them peculiarly adapted to the farming of this section of New England.

Now, there are a great many farmers, I think, who find it for their advantage, under the circumstances I have described, to select animals like those of which I have spoken. Gentlemen who propose to keep such animals must have just as good pastures and winter feed as some of those persons who spoke yesterday of the condition to which they have brought their pastures by careful renewal have got. Such animals will not browse on barren hills; they cannot live on sandy plains; they cannot live in mud holes. These animals must of necessity go to the good farmer who takes care of his pastures, and especial care of his mowing land.

Then we have another class, and that is the smaller animal of which I spoke in the beginning. Not exactly the kind of animal we now have. This question is of different "kinds" of animals. Now, sir, we have one kind of animal in New England, the special utility of which I have never been able exactly to ascertain. I think they may be pronounced the poorest "kind" that was ever heard of. We are told that they sprung from certain animals brought here by the Puritans. If the Puritans did bring them here, they were the poorest thing they brought. They have no sort of shape that is satisfactory to a judge of cattle; their whole external outline is in violation of every rule of breeding; their whole physiological condition in violation of every law laid down by those who have studied the animal physiology, with reference to breeding. Their prominent point, apparently, is their horns. No intelligence in their eyes, nothing fine about their muzzles, no indication that they have any qualities except those dull, heavy, stupid, inanimate qualities which enable them to go through the dullest toil on the poorest conceivable farm known on earth. Their heads and horns will almost outweigh all the rest of their carcases. You find them with bad crops, broken off behind the shoulders, raw-boned and rough; their skins as hard as a stove-pipe, nothing mellow about them; their hair as hard and inexpressive as the stubble of the grass that was mown in the middle of the drought of last summer. Now and then you find some person who owns one of these animals, who will say to you, "I have got a cow that will give twenty quarts of milk, and she is a native, too." He never tells how much it costs to get the milk, or how much food it takes to keep her in that condition. She presents herself with a tremendous capacity to carry food, and she ought to do something in return for it; but she is an exception. If you will examine the picture of the Oakes cow, which, fifty years ago, was a famous cow in New England, you will find that although she was a profitable cow for the dairy, she had no point to recommend her. She was a mere accident, and never transmitted any of her qualities. You will find there is not a single representative of that cow now that is of any sort of value to any farmer of New England.

Now, that is not an extravagant description. Those gentlemen who were with me on the pleuro-pneumonia commission, know perfectly well the kind of cattle they too often met with. There were some herds of good cattle, but I would like to ask you, sir, [Mr. Lathrop,] how many scores of yearling and two-year old steers and stags that would have had but little to recommend them, were found in the region visited by that dreadful disease. It seemed to me that they would hardly pay for wintering. They undoubtedly converted a large quantity of coarse food into manure; but I doubt if they themselves were worth much more in the spring than they were in the autumn. Any of you may find the same thing in other parts of the State, and too often in the hands of farmers, who, in other respects manage their farms well.

I do not think these animals are creditable to the agriculture of Massachusetts. There is no reason why, from the eastern boundary of Maine to the southern boundary of Connecticut and Rhode Island, there should be found animals of that description, for we have scattered all over New England male animals of the best description, offered to farmers at the most reasonable prices; and if gentlemen examine those places where the best animals have been produced, they would find that it has been done by the infusion of good blood, brought there by some enterprising and careful man. Go up to Berkshire—not a very promising part of Massachusetts—not a place in which you can plant corn and sit at your doors and see it grow; not that part of Massachusetts where the frosts cease so early in the spring and keep off so late in autumn, that the farmer has a long and luxuriant season before him; where there are good pastures, it is true, but not what would be called an easy, fine, or luxuriant farming country,—go up there, and what do you see? Why, in one of those towns, by the introduction of a good Shorthorn bull, has been established a race of animals which has brought wealth into the town, and has made the farmers prosperous. Go, not four miles from here, and what do you see? By the careful introduction of that kind of blood which has been so prudently bred and husbanded in this valley, a herd of cattle has been secured, which, although not in the Herd Book, will vie with any herd in or out of it that can be found in the world. In New Hampshire, in Connecticut, and in Eastern Massachusetts you find the same thing.

Now, that is the *kind* of animal that is worth having in New England; I will not say the *breed*, for I will not undertake to define which breed is best adapted to any given locality; let every farmer judge for himself. There are men here who know perfectly well that the introduction of a Shorthorn bull into their region is a perfect blessing to them. I see plenty of men who know that the introduction of an Ayreshire bull into their region is a little more than a blessing to them. Let every farmer judge according to his necessities, and you will then have, not the poor kind of animals I have described, but good kinds, each of a good quality, and each adapted to the locality in which it is produced. If there is any section of the State in which large, heavy cattle can be produced to profit, let them be produced there; and those of us who live in a section where the pastures are shorter, where it is important that the milking powers of our animals should be kept up almost the season round; where we are obliged to feed good hay to our cattle and some grain; where the temptation of a milk market is not to be resisted, even if a little money is lost in the winter,—in these sections, we must have an entirely different kind of animal. Let this be the rule,—a sort of universal rule,—we will have a good kind of animal, at any rate; a kind and description adapted to the climate, soil and location in which we live.

Now, then, what is this kind? There are certain rules which you cannot violate. You may breed for one thing or another, but there is a certain shape of animal which belongs to a proper and good kind, which you cannot violate in any way. You cannot make a good cow out of a poor one; at the same time there are certain rules by which you can judge of the different kinds of animal the farmer may adopt. For instance, you begin at the head. Every man knows that there is no animal on the face of the earth that has not just as much expression in its countenance as any man, according to the class to which it belongs; and that is almost the first pre-requisite. I do not mean to say that I would have animals with a fine-drawn, small-sized, or admirably-chiselled head, but I would have heads that present indications of strength; width of forehead; not a great preponderance of horns, but the horns nicely set on; great length from the root of the horns down to the eyes; width between the eyes; the face below the eyes not brought down and tapering to a point, but gradually approaching a good, luxurious, ample muzzle, expressive of a vigorous appetite and good nutritive functions ; and, at the same time, that degree of brightness and patience and amiability about the eyes that is so agreeable in all living beings,—the horse and the cow, man and woman. I would have a clean, thin, finely-shaped neck, not too long nor too short, with a certain depth down through to the brisket, which indicates strength of circulation. If I am told that the male of such a cow would have an effeminate, cow-like neck, I pause there. I want a masculine, not an effeminate-looking bull. I want a firm, strong, well-rising crest to the neck, indicating that he has got the will as well as the power to protect the females of the herd. As to the shoulders, you want the animal snug, compact in the shoulder, for beef. If for the dairy, you cannot be too particular about the compactness with which the shoulder-blade is set on the top, and the uniformity with which it comes up there ; neither can you be too careful to have the bone of the lower part of the shoulder prominent and well-developed ; not round and tight and snug, but long from the elbow to the point of the shoulder, and, as the animal moves, free and easy in its motion. Then, when you come back to the ribs, you want a rib springing with grace from the spine ; not a flat-sided animal, nor one with a round, thick-feeling rib. You may be sure there never was a good dairy cow that had what is usually called a round rib. I speak of the rib alone and not of the shape given to the carcase by the ribs. If such a cow gives you twenty quarts one day, in three weeks she won't give you six. On the top of the spine, the processes should be loose and open. As you come to the hind-quarters, let the line from the hip back to the tail be as straight as a water-level can make it. Then you want a well made, solid hind-quarter, not too thin nor too thick, but well muscled ; and a hind leg strong, firm, that looks as if it would stand the wear and tear of fifteen years of hard labor. And the legs should be well-defined, finely drawn, and looking as if there were strength and nerve in them ; not legs particularly round, but in which all the cords and muscles stand out with vigor, as if they had good blood behind them to keep them in good order. The skin should be soft, the hair lively. The matter of color is not of great importance. If you will adopt this rule, I think you will find that no animal made up in that way will fail to feed well. And this is the reason why Jerseys, which as a breed are not well made, are unprofitable feeders, as compared with other breeds known to have better forms, and consequently better constitutions. If you govern yourselves by the character of your pastures, you need not be afraid that such an animal as I have described will fall to pieces in the summer. If the size is what is adapted to your land, they will know how to take care of themselves. So, then, as a general rule for New England, let us adopt some such system as I have advised, and let each man, or let the men of each locality, govern themselves by the necessities of the case. I am confident that more attention to the structure and quality of the animal, and less devotion to large, imposing size, would be advantageous to most of the farmers of New England. Medium sized, well-shaped animals seem best adapted to our farming.

Adopting that rule, and being guided by the light which that throws upon you, you can all arrive at the same thing which I have described. I do not mean, however, to say that it would be to the advantage of every man to enter into cattle husbandry; I am describing what should be done by those men who would go into it; and as we must all go into it more or less, let us adopt the rule that we will have the kind adapted to the soil and climate in which we live, and to the neighboring markets. Then I think the whole class of animals will be improved here, and we shall not, as now, be compelled, of necessity, as officers of agricultural societies, to bestow premiums upon animals that are not worthy to be driven to an agricultural show. If I have succeeded in opening the debate, Mr. Chairman, I have accomplished just what you requested me to do.

Mr. PERKINS.—It is the feed that makes the animal, to a great extent, and we cannot get good animals without good feed. The suggestion has been made here that cattle can be kept a little short in winter. That is not the experience of the people up our way; and my observation is, that where the cattle are close kept, the people complain of hard times, and the cattle show it; while those that are well kept show good times, and the people think that the times are good, too. In order that cows may do well during the summer season, they should be well kept through the winter. The farmers up our way in

Berkshire County, who are most successful in their dairies, keep their stock the best. I used to think, a good many years ago, that if stock were kept a little short in winter they would grow enough more in summer to make it up; but if an animal grows one or two pounds a day in winter, it is more likely to grow three or four in summer than if it had not grown at all in the winter. The quality of the milk is an object in making butter and cheese, and a dairy cow that is well kept will raise more cream than a cow in a low condition, and make more cheese.

The agricultural qualities of Berkshire County have been called in question here a little. Representing a part of that county, I must stand up in its defence. I believe we have as good land in some parts of that county as there is in the State of Massachusetts, or in any other State in the Union. To illustrate that, I will say that I have in mind a man who last year raised sixteen acres of corn, without any manure, with the exception of a little plaster and ashes put in the hill, and sold eight hundred bushels, and kept what he wanted to use, and he has a large family, and keeps a large stock of cattle. That corn was raised at an expense of only about fifteen cents a bushel for labor. I have in mind another man who has raised eight acres last year, and got between ninety and a hundred bushels to the acre. I have in mind another man there who has raised his sixty acres in one body. What the result will be I cannot tell you, but it will be something, with corn at $2 a bushel. And that was raised without manure.

Mr. STEDMAN, of Chicopee.—I think we shall all agree that the question how to obtain the best dairy cow is of the first importance to Massachusetts farmers. I would suggest, as my opinion, that the best way this can be done is by selecting the best common, or native cows, and crossing them with a thoroughbred bull, and so continuing, using none but thoroughbred bulls, of some one of the breeds. And in the selection of a bull, we should not only be sure that he is a thoroughbred, but that he is descended from a milking family, as it is well known to those who are conversant with these matters, that there is a vast difference in each of the breeds in different families; some of the families of the Shorthorns, for instance, having cows that produce scarcely milk enough to feed their calves, while others yield a generous flow, and for a great length of time. This matter has been greatly overlooked.

As I said, the dairy is of the first importance, yet, at the same time, we must keep in view the production of meat. When good cattle are worth upon the foot $10 a hundred, it is very doubtful whether we can afford to lay aside this consideration entirely, destroy all the male calves, and give our attention wholly to the dairy. I believe the production of meat is a source of profit, and should be connected with the dairy; and having this in view, it is desirable that we should select animals that possess qualities for the production of meat, size being one, as it is well known that well-proportioned, large animals, bring a larger price per pound than small ones, while they can probably be reared with as little expense. So that in those sections of our State where large cattle will grow to advantage, it is better that we should introduce some of the larger breeds; and I am free to say that I have found, in most sections of the State, cattle of this description. In Berkshire, in Franklin, in Worcester, and, I believe, very generally, throughout the State, we have pastures that will carry these cattle through the summer, and it seems to me that the great Shorthorns are, upon the whole, about the best cattle for the largest section of our State.

Prof. AGASSIZ.—I had some thought of taking up for the subject of my lecture this evening, the physiological principles of breeding, with reference to what may be done to improve our various kinds of domestic animals; but as I see that these lectures are attended by ladies as well as by gentlemen, I may, perhaps, take this opportunity to make a few remarks upon this subject, which are akin to the present subject of discussion.

In the first place, I would say a word with reference to the advantage of small-sized cattle. Allusion has been made to the cattle of Switzerland. In the days when I lived in that beautiful country, I paid little attention to the cattle, or other domesticated animals, or to subjects akin to the objects of this Board, but I have distinct recollections, and one of those recollections bears upon the subject under consideration. It is important to know why we have such extreme differences in the size of our cattle. There is no doubt, that with reference to the production of meat, we should have as large individuals as possible; with reference to the production of milk, we should have the largest amount of production of that kind with the smallest animal, requiring the least amount of food. Now, there is one striking feature in the distribution of cattle through Switzerland: that in the interior parts of the country, in the Alpine districts especially, the cattle are all small, while in the western part of Switzerland, in the subalpine districts, and in the Jura, the cattle are all large. When you inquire into the possible circumstances which produce that difference, you have at once the answer if you look at a geological map; and here geology appears in direct connection with agricultural pursuits. In those districts of Switzerland which are entirely made up of granite rocks, with talc and mica slates, and gneiss—primitive rocks, as they are called—you find nothing but small cattle. In those regions where the subsoil is formed of limestone, the cattle are large. You see at once the explanation. In the one district, the animal has a large supply of limestone with which to build up its bony frame; in the other, the supply of lime is small, and the animal cannot build up a large frame.

Now, let us apply that fact to our purpose. I say, if it is an object to produce a large kind of cattle, you must provide your cattle with lime, that they may build up a large frame. But we have no limestone in Massachusetts, and how shall we do it? I propose to the intelligent farmers who are interested in this matter an experiment. Let them put some crushed lime in the food of their cattle, and see how that will answer. Let them try in what shape and manner they can increase the size of their cattle by adding chalk to their food, so that they may have the elements out of which to build a large, bony frame. I have no doubt, from the interesting remarks I have heard yesterday and to-day, and the large amount of information I have been able to collect from the lips of so many practical farmers, that, having these suggestions, they will at once know how to apply them. I do not know how to do it. I have never been interested in raising a single cow, so I do not know how to take care of cattle, and would not know what to advise; but I am a physiologist, and know what are the principles of physiology, and I am satisfied that to raise large cattle, you must introduce into their systems, with their food, a sufficient amount of limestone to build up a large, bony frame, and that you must do this artificially, where nature does not provide the cattle with a sufficient amount of lime in the waters from which they drink, and in the rocks against which they rub themselves, to make their bones. With us, in the Jura, or in the canton Freiburg, in the Alps, which is a limestone country, every pail of water contains a large quantity of lime in solution, and every cow that drinks, drinks in bones, or at least lime, with which to make bones. That lime we must supply.

Now, with reference to breeding. And here breeding comes in for a share in making these good kinds or poor kinds of cattle. Let us examine what the native animal is;—and again I say, that when you have these principles before you, I know that, in a very short time, whatever value they have will be applied to the promotion of agricultural improvement. I believe that all our discussions are a little too loose; that we don't understand all the elements of the question sufficiently to know by numerical value what there is in one and what there is in the other proposition that is discussed. I hear the characteristics of a dairy cow spoken of in contrast with those of a beef animal; but I want to know what there is that makes up two such different animals. Differences in form have been alluded to, and differences in situation have been alluded to also, and these ought to be considered separately; but there are differences in substance of which I have heard nothing said. I should like to ascertain—and for that experiments must be made which we have not on hand—what is the percentage of bone in the best animal to fatten or to raise for beef, what the percentage of skin, of horn, of hoof, of blood, of lymph, of liver, which goes to make up the sum total of the weight of the animal, and how far there is a difference in those respects between the different kinds of cattle which we raise. No work gives us these facts yet; but now there is growing up in Cambridge a Museum of Comparative Zoölogy, in which there is a special department devoted to domestic animals, and I am trying to bring together there, to begin with, skeletons of the different varieties of animals which we raise. I have not been able to get, thus far, any but the common kinds of these animals, with the exception of a few valuable horses, known as distinguished trotters; but I should like to obtain for that Museum animals, the qualifications of which, during their lifetime, have been known, and when such animals die, I wish that gentlemen interested in having these things recorded, would have the kindness to let me have the carcase, especially where the death is accidental, because then, when the animal was in full vigor, it will be possible to weigh it, and ascertain its total weight, and then go on to an analyzation, by which it can be ascertained how much the skeleton enters into the weight, how much the flesh, how much the skin, and how much every part, so that we may know, after a number of such experiments, whether there is, in the devolopment of certain portions of the system, a leading influence in producing those qualities which we require. As long as we speak generally, we have no means of ascertaining in what direction our efforts in breeding or raising cattle must go, in order to secure the animals which we want.

Now, with reference to breeding. In breeding, we must remember that every animal has a number of elements in it by which it may be distinguished from every other animal. All the individuals belonging to one kind of cattle, all cows and bulls put together, with their calves, or the whole race of cattle, for instance, have certain properties which distinguish them from the horse, the donkey, the sheep. Now, the primary peculiarity of all animals is that they transmit, generation after generation, that sum total of qualities. Inheritance or transmission of qualities is the primary feature of all animals; and this transmission consists not only in transferring, generation after generation, the general qualities of the whole race, but in a difference which is fundamental. There is always a certain proportion of male and female. Whatever be the qualifications or the peculiarities of the kind of animal, there is that primary difference at once established; there are so many males and so many females of each kind born, by which the process of reproduction is maintained. That is one of the primary laws of organization, and that essential difference extends throughout the whole animal kingdom and throughout the whole vegetable kingdom. There is that essential, primary difference between one set of individuals and another set,—that one certain ratio is male and the other is female; and these two elements combined constitute the means of the transmission of those qualities which are common to them all as a whole. You must, therefore, always take these two elements into consideration in the propagation of animals,—the qualities of the two sexes.

Now, individual animals, again, have some very important share in this. If I look at this assembly, I see no two individuals alike, and if I go out of doors, the same impression continues. I see no two men nor two women alike; and if I go to the farm, I see no two heads of cattle alike. Besides these common features which go to make up humanity, or which go to make up the cow world, the horse world, the donkey world, the sheep world, the pig world—besides these common features, there is individuality noticeable everywhere, and that individuality is marked. Every shepherd knows how to distinguish every individual of the flock he owns.

Now, this individuality is not altogether transmissible, as the general properties which go to make up the whole race are; only a part of these peculiarities of the individual being are transmitted, generation after generation; for you will notice that the children of one family are not all like the father, nor are they all like the mother, nor are they all even a mixture of the two. And what is true of man is true of animals. Every individual born from the same parents may differ from both parents, or may have a certain degree of resemblance to both parents. Let us, therefore, not forget this second law of reproduction, which consists in a partial transmission of individual characteristics, while there is a total transmission of those general features which go to make up the kind of animal. We never expect to have a horse born from a cow—we expect a calf, a young cow or a young bull; and we expect that, within a certain limit, that calf will share the properties of either the mother or the father, but we know that it will not do this fully. Now, what can we do to ascertain what we shall get?—for it is on the assumption that, having a male of certain qualities and a female of certain qualities, we can get the best animal out of the two, that we proceed in introducing a certain distinct animal into a herd, with the expectation of improving the progeny of that herd. We may make tremendous mistakes in so doing, and I want to point out the basis of these mistakes, because they are the foundation of all our disappointments. I am not prepared to tell you how to remedy all these disappointments, but I will point out their sources that you may, in your practical wisdom, devise the means to obviate them.

An individual, however distinguished he may be in himself, has, in consequence of this law of inheritance, combined in himself a variety of elements which may reappear in his progeny. Now, remember that an animal may be as distinguished an individual as you could wish to have as the head of a desirable progeny on your farm, and yet, notwithstanding these apparently eminent qualifications, he may be vitiated for the purpose for which you want him because of some characteristics of his ancestors. An animal is not made up of the elements of his father and mother alone; he has also the elements of his grandfather and of his grandmother, and he has the elements of his whole race behind. Now, within certain limits, these ancestral elements come up again, and they come up again especially in the third generation. There is a singular law which pervades male animated nature throughout, which is recognized as a physiological principle, and that is, that some features of an animal are transmitted, not so much directly to his immediate descendants, but to his grandchildren, to the third generation. You must, therefore, before you can be sure of proceeding in the right way, know the ancestry of your breeding animals for at least three generations back; otherwise you may have cropping out the characteristics of the grandfather or grandmother where you least expected them; and the grandfather or grandmother of that distinguished individual may be the last animal you would want to have on your farm. Do not, then, trust animals that are trumpeted all over the country as distinguished animals, before you know what were their grandparents, otherwise you may be greatly disappointed and deceived. That is the first condition of successful breeding. You must know that you have a family which has ancestral qualities to be depended upon before you introduce that animal as an element of growth into your herd. I am glad that I do not know any of the valuable and celebrated animals in the community, because I am able to speak with a degree of independence which I should not possess if I knew my friend A, B, or C had a valuable bull, or a valuable horse, which yielded him so much income, and whose reputation it was desirable should be kept up. I have no such friends, I am happy to say here, and, therefore, I can speak upon principles, and shield you, by those principles, from the mischief you might do by trusting too indiscriminately to representations which may be, after all, very indifferently founded. I think that the criterion of success will be the progeny of successive generations. I would trust such animals as have descendants, and as show a fine family in several generations, and out of such a family I would select my individuals for further propagation.

Now, this matter of the partial transmission of qualities consists of other elements besides this male element,—there is the female—and there are other elements besides those of ancestral inheritance, which are to be considered. There are the qualities of herd, there are the qualities of species, there are the qualities of race. And here we must again inquire into two very different subjects. The qualities of breed and the qualities of species are totally distinct, and I think that the proper distinction is not always made. My friend, who spoke so learnedly, so fully, and with such an amount of experience, yesterday, on the culture of the grape, made, in one of his statements a mistake (if I am not mistaken myself,) in that very particular, when he used an expression which should apply only in one given sense and not in an indiscriminate one. A hybrid is only the offspring between two different species. A hybrid can never be produced between two varieties of the same species.

Mr. BULL.—I used the common horticultural term.

Prof. AGASSIZ.—I know, sir; but let us be careful to introduce into our discussions only such definite language as makes misapprehension impossible; for we want to have that precision which shall be beyond the possibility of cavil from misapprehension, and beyond the possibility of misinterpretation from looseness of statement. How shall we secure this with reference to these different kinds of animals? By using just such terms as will designate the one we want to designate, and that only. Now, species are formed in nature, with all qualifications; they are God's creations. Breeds are formed under the fostering care of man, and differ according to the circumstances under which they have been raised,—they are human manufactures. That is the difference between a breed and a species. All our cattle are of one species, and they produce nothing but cattle;

and every species produces nothing but its own kind. Breeds are the result of the interference of man with these creations of God, in the manner which will suit his peculiar pursuits or objects, and they are his work. Men have made breeds. They are not God's creation, they are man's production; while species man never made. We have found them in nature; we have subdued them, we have appropriated them to our purposes; they have been endowed with certain peculiarities which are pliable, and they are capable of being impressed in various ways by man—one species more than another—so that different breeds, more or less different, can be obtained.

Among dogs, which are more pliable, physically, than any other of the domesticated animals, the breeds have a range which is astonishing. Compare a bulldog with a greyhound, a King Charles' spaniel with a mastiff,—what an extraordinary difference! There is no such difference among cattle or horses. And why? Because by nature this species was more pliable to influences than others. Now man has to apply himself to that pliability, and impress upon these animals those peculiarities which are useful or desirable for him.

Now, these specific differences and these breed differences are of a different kind. A species transmits its characteristics unmistakably and always, and the sum total of its specific character is transmitted. A breed, being the product of man, transmits its peculiarities, its qualifications, only partially, and only as long as those things which produce them or maintain them are at work. Cease to take care of these animals in the way in which the differences produced may be maintained, and the breed itself runs out. You cannot perpetuate them without taking at least care that those conditions which will maintain the breed differences as they have been produced, are continued.

Now, when you propagate animals, there is a certain limitation to the fecundity. Only individuals of the same species are absolutely fertile with one another. Individuals of one species with individuals of another species have only a limited fertility. You may be sure to see individuals of the same kind bring forth individuals of that kind and no other; and these individuals, you may be sure, will be capable of reproducing their kind in turn, generation after generation. But cross individuals of two different species with one another, and you at once obtain hybrid; that is, what we call hybrids, or what we call mules; and these hybrids or mules always propagate individuals of two different kinds, and their fecundity is limited; sometimes so extremely limited that even the first generation is sterile; sometimes partially fertile by a return to the parent stock. Between themselves, the individuals born from two different species are hardly ever fertile *ad infinitum.* I will quote an example to show what I mean more distinctly. The horse is one species, the ass is another species. Horse with horse produces horse, *ad infinitum;* ass with ass produces ass, *ad infinitum.* But horse with ass produces a mule, or a hybrid. Now, that hybrid always has part of the character of one parent and part of the character of the other parent. It is not a representative of any species, but it is a half-breed. And here the English names designate truly the characteristic of that animal. It is a "half-breed," or a "hybrid," or a "mule." Those three names apply to that kind of animal, and they should never be used to designate any other. The word "hybrid," the word "mule," and the word "half-breed," should never be used except to designate the progeny between two different species. And that progeny will differ according to the character of the father or the mother. The offspring of the male horse with the female ass is not the same as the offspring of the male ass and the female horse, by any means. What is commonly called a mule is the offspring of the jack with the mare. We do not raise the offspring of the horse with the ass; but in France they are sometimes raised, and are known there as *bardots.* Now, the *bardot* is a very different animal from our mule; it has a greater resemblance to a horse, only it is a small-sized donkey. The form of the head, the hoof, and the tail are those of the horse. Now, the reverse is the case with our mule, which has the size of the mare; but the form of the head, tail, and hoof, of the donkey. May we not, by these crosses, ascertain, in a measure, what kind of character the male will transmit to his progeny, and what kind of character the female will transmit to her progeny? I suppose that a thorough analysis of the difference which exists between the *bardot* and the mule, as compared with the horse and the ass, would give us a large number of very valuable hints as to what we may expect in the transmission of the qualities of the male and of the female to the progeny; for we have not yet made the experiments in breeding that will enable us to ascertain that with any degree of certainty, because, in all the experiments of which I have been able to find any record, the breeding individuals have been taken as if they had no ancestry—as if no qualifications could be transmitted to the progeny besides those of the mother and of the father. And yet, if we look to this law of ancestral transmission, we know that any progeny may show characteristics which are neither those of the mother nor of the father, but those of a remote ancestor, three generations back.

Now, therefore, we must begin our experiments with reference to the transmission of qualifications from the male or the female, if we would have at all a trustworthy basis. And how shall we proceed? Here I propose one problem for solution. I have no results to give, gentlemen, and you will at once see how difficult it will be to obtain a result at all; what extraordinary, costly and difficult conditions must be met in order to obtain a result that shall have any value whatever. But I think the time has come when we must stop arguing on a loose basis, when we must begin to make experiments that shall have all that scientific accuracy on which we can rely. I am sure that Massachusetts farmers are the men to do this work for the progress of agriculture, for I see from their discussions that whatever they do, they do thoroughly; that whatever operations they enter into they analyze to their satisfaction. Now, if they would ascertain what are the laws of inheritance, or in reference to breeding, let them first secure individuals from which they have eliminated the elements of ancestral transmission. That is the first thing to do; just as when astronomers compute their observations; they begin by looking over the observations, in order to know which they are to take into account, and which not. There are observations made by unskilful hands, and if they were taken into consideration, in a computation in which a thousandth part of a minute is an element of great importance, you see at once that a single incorrect observation would vitiate all the results of the good ones.

Now, the first thing an astronomer does when he goes to work on his observations, is, to see how the observations were made, and on looking over the books, he sees at once that here are observations that he must leave out, page after page; and here are observations that look as if they had been made with the proper care, and these he will take as the basis of his computation. Now, you must proceed in the same way, and when you read of satisfactory results obtained by some experiment, you must not shrink from the painful investigation as to whether it was made with proper care, and a due consideration of all the elements which should enter into the computation. Therefore, tell your friends, and tell yourselves, when you are satisfied that they and you have made mistakes, that these previous observations are good for nothing, and go to work. Learn to tell yourselves that what you have done is worth nothing, and then you will be on the road of progress.

It is difficult, but it is the advantage the scientific man has over the practical man. The training of scientific men consists in nothing else but in learning how to set aside their own doings, to criticize their own observations, so that they shall know what is worth listening to and what not. That is the source of our strength, that is the foundation of our value in community—that we learn (and that is our special office,) how to criticize whatever we do. Now, I think, from what I see here, that you will learn that very soon, and when you have learned that, you will proceed with confidence. The first thing to eliminate in this experiment concerning the transmissibility of the qualifications of any animal is the ancestral element.

How will you do that? By breeding one or two generations in-and-in, without affinity. Here I state a limitation which is not perhaps understood, and I will explain. In order to have stock on which you can make a sound experiment, you must breed together individuals as closely allied as possible, but which shall have no family ties. There is one important element when you speak of breeding in-and-in. I have never heard the distinction referred to that I now make. Breeding in-and-in may mean, according to the way in which I hear it discussed, breeding brother and sister, or father and mother, as well as breeding together individuals which resemble one another very closely. Now, there is a vast difference between these two modes of breeding in-and-in. Breed Anglo-Saxon with Anglo-Saxon, does not mean that brother and sister should intermarry The breed of Anglo-Saxon is improved by the intermarriage of Anglo-Saxons, but of Anglo-Saxons who have no family ties;

but the breed will be spoiled if you breed in-and-in Anglo-Saxons, brother and sister, or mother and father. One is a moral crime; the other is the foundation of national superiority. You see at once the difference. Now do the same thing on your farm. Breed in-and-in, but do not permit incest among your animals. Breed in-and-in those who are of the same kind, but do not breed in-and-in those which have such close family ties that you would breed disease in them by the closeness of the blood. That distinction is the first fundamental distinction of all good breeding. You must breed in-and-in, to have the proper stock to experiment upon, for several generations, so that you shall have animals that will hold the same ancestral relation to one another. You see, therefore, that to procure a proper animal for experiment will take you several generations. You cannot get that easily with cows; you may get it more easily with sheep; and in a series of experiments which I have proposed to some of my friends, I have advised them to take sheep, in order sooner to have the elements upon which to make sound and valuable experiments.

Now, when you have the third and fourth generation obtained in that way, by the connection of individuals closely allied to one another, but which have no blood relation to each other, then you have individuals from which you have eliminated the ancestral element that might re-appear in the next generation. Suppose you prepare in this way a number of coarse-wool sheep, so that you have male and female individuals which have no blood left except that of their own, and you prepare in the same way another number of merino individuals. Now, you cross them both ways—merino ram with coarse-wool ewe, and, *vice versa*, coarse-wool ram with merino ewe, and you will very soon ascertain what is the transmission of one male with one kind of female, and of another male with another kind of female. You will then have experiments which will begin to be valuable with reference to the law of transmission of the peculiarities of breed through breed; of that crossing between breed and breed which is so different from the intercrossing of individuals of two different species. The law of the transmission of qualities from breed to breed, in crossings of breeds, is yet to be ascertained. We have nothing but guess-work about it so far.

The discussion of the question was continued by Mr. Fisk of Shelburne, Dr. Loring, Mr. Stedman, and others, till the Board adjourned.

Afternoon Session.—Met at two and one-half o'clock. Mr. Lathrop in the chair. A lecture was delivered on

THE HABITS OF INSECTS IN THEIR RELATIONS TO MAN,

BY MR. FRANCIS G. SANBORN, OF BOSTON,

Entomologist to the Board.

Mr. President and Gentlemen,—I have been requested to address you at this time, upon the subject of Economical Entomology, or the science of insects, their habits and transformations; with a view to ascertain the easiest mode of destroying such species as are proved injurious to our crops, or of protecting and cultivating those which are practically our friends.

In the very outset of my task, I am met with the barrier upraised by popular prejudice, and the general contempt for, or ignorance of the nomenclature of this science. With no desire to be hypercritical, I cannot ignore the fact that those very persons who would be the first to notice, and ridicule such misnomers as the "Devon horse" or the "Southdown bull," speak with the most perfect complacency of the "rosebug," the "seventeen-year locust," and the "flying grasshopper;" terms which sound to the full as ludicrously in the ear of a naturalist. This condition of affairs cannot be reformed at once, and yet the prospect of a general knowledge of natural history grows brighter from day to day. When we shall have learned to teach the *results* of the past, and the *details* of the present, instead of the *details* of the past, and the minutiæ of the remote, we shall have accomplished more for the advancement of that knowledge which is power, than the most sanguine apostles of practical education ever dreamed of.

Is it the most important to the embryo farmer, to acquire and retain the names of the founders of Rome, and the number of rivers emptying into the Caspian Sea, or to be able to distinguish between the sorghum and the Indian corn, the hawk and the robin, or the cutworm and its destroyers?

In our excessive devotion to antiquity, we seem to me to resemble the captive, who, after weeks of toil has succeeded in digging his way through the walls of his dungeon, to liberty and light, but who delays his escape, in order to count the fragments of rock he has left behind him. Not that I would attempt to decry the advantages of a so-called liberal education; not that I derive no practical lessons, nor worthy examples from the history of *man's* life and deeds in years bygone; but that I would devote at least an *equal* proportion of time to studying the works of the Creator which *are* the past, the present, and the future. Let those subjects with which the learner must grapple in his every-day life, be the *first* inculcated. Let him be taught not to look at, but to *see*, and let the simple facts of natural history take the precedence of vague traditions of the world's childhood, and superficial accounts of foreign countries.

Thus only will he be enabled to solve, the now impenetrable mysteries of his surroundings, and to distinguish between the foes and the friends of his prosperity. We cannot afford, God help us, to laugh at each other's ignorance, but our descendants will not hear those constant misnomers that have shocked my, perhaps, too sensitive ear, and may reasonably smile at the man who, after forty years' experience of cattle, discovers that they have no front teeth in the upper jaw. For ourselves, we must glean what information we can in the intervals of labor, and guard our crops as best we may.

The universal search for an *insect elixir mortis*, of easy application and speedy effect, bids fair to be rewarded in the sea of petroleum or coal oil, which now floods the country. This immense supply of material which has given a new impetus to the inventive genius of our mechanics, and drawn already to a great extent on the resources of the chemist, ought not to be neglected by the agriculturist. Its cheapness and efficacy in destroying insect-life are unanswerable arguments in its favor. Are you afraid that it will injure your fruit trees, or render the soil unfit for the growth of your crops? You have only to try it; experiment faithfully with its different modifications and combinations for a year or two, and do not confine it to a single crop, nor application. Then, if you are not satisfied of its utility and necessity, discard it, and not till then. I speak advisedly. I have had personal experience of its uses for several years. I have applied it to nests of the tent-caterpillar, the apple-tree pest, and effectually dislodged them. I have poured it around the roots of vegetables, attacked by various maggots, and prevented their ravages without injuring the plant in the least perceptible degree. I am fully satisfied that a large number of noxious insects, especially those infesting our root crops and fruit trees, may be successfully treated with this oil in the crude state, or with a soap made from it and diluted with water to the same extent as that prepared from whale oil; namely, for trees of thick bark, a pound of the soap to a gallon of water, and for leaves and roots, the proportion of water may be increased to five gallons.

Upon the bark of various fruit and shade trees, are found minute scale-insects belonging to the genera *Coccus*, *Lecanium*, and *Aspidiotus.* In the spring, about a week after the bursting of the leaf buds, their eggs are hatched, and the tender young, spreading over the tree, commence sucking the sap. A thorough painting of the bark, with the petroleum or its soap, for two or three days after the escape of the young, will be found an infallible remedy. The borers of the apple, quince, and peach, may be prevented from laying their eggs by the same application, or if already laid, these may be destroyed in the same manner. It is highly desirable that an extended and thorough trial be made of this substance upon different crops, throughout the State, and that reports be furnished to the State Board of its effects, its proper strength, and mode of application, in order that we may obtain additional facts, and circulate the results more widely. I shall proceed to give a concise account of some of our native insect enemies, their history, and mode of attack, with suggestions as to the best methods of repelling them. Among our fruit trees, we find the apple attacked by a number of insects of different groups, varying in the locality of their ravages from the roots beneath the soil to the extremities of the branches, the leaves, and fruit; some of them subsisting solely on this tree; and others, common to the pear, the quince, and even to some forest and shade trees.

When the leaves turn to a paler or yellowish hue, without any perceptible cause, and the tree seems to be enfeebled, a removal of the earth immediately about the roots, will frequently discover numbers of minute plant-lice or *aphides.* This is the plural of *aphis*, a Greek word, meaning an exhauster or depriver of strength, belonging to the genus *Pemphigus*, of Hartig, the *Eriosoma* or woolly-bodied aphides, mentioned by Dr. Harris. These are busily engaged in sucking the sap, and if they have been at work for more than one season, there will frequently be excrescences of solid wood, varying from the size of a mustard seed to two or three inches in diameters, growing from the roots of the tree like bunches of small potatoes; these are caused by the punctures of the plant-lice, in the same way as the galls upon the oak, and swellings of the stem of the golden-rod by other species of insects. Among these tubers, and clustered around the roots, are the young, or *larvæ*, of a light color, and about one-twenty-fifth of an inch in length, having a small thread, of a whitish substance, extending from the tip of the abdomen. At the close of the season, the adult insects of about one-fourth of an inch in length, and furnished with wings, will be found. These are of a black color, but almost covered with a bluish-white down, upon the upper surface, resembling fine wool; their wings are transparent, and folded over the body like a roof. Their fecundity is a marvellous theme, and is a part of the history of the race of plant-lice. According to Reaumur, one aphis may become, in a single season, the progenitor of over five thousand millions of descendants. The egg deposited in the fall is hatched in the spring, each one producing a female; she in the course of a few hours becomes a mother and gives birth, not to an egg, but to a living daughter, who in turn, may be in a week from the commencement of her existence, a great-grandmother. This continual propagation of females continues through the summer, when the males again occur among the births, and both sexes then acquiring wings, copulate and deposit eggs for the spring brood.

With such enormous powers of multiplication, we might reasonably apprehend the speedy destruction of all our crops by this little creature, were it not that their insect enemies and other causes tend to reduce their numbers materially, and keep in check this vast army of suckers, or exhausters, as they are significantly named. The little black-spotted red beetle, which children call the lady-bird, the lace-winged fly, or golden-eye, and the black and yellow-striped flies of the Syrphus tribe, as well as internal Hymenopterous parasites, are continually feeding upon them. In fact, the author previously alluded to. considers them "the very corn" sown for the use of other insects. We, however, prefer to compare them to herds of cattle, inasmuch as on the other hand they are protected and cherished by the ants, who are repaid by the honey-like excretions of the aphis, yielded at the lightest touch from two small tubes near the extremity of the body. In turning over a stone in the field, who has not seen the busy and anxious ants removing, with the utmost care, not only their own defenceless young to a place of safety, but also showing an equal regard and solicitude for the little whitish oval plant-louse, whose six minute feet are barely able to support her, and totally unfitted for running away. Tenderly picking her up in their mandibles, her sturdy guardians make off at a rapid rate, and after all are in safety, and the bustle caused by the sudden unroofing of their residence has subsided, the little aphis is reassured by the gentle caresses of her protectors, and gives down her honeyed milk to their skilful manipulations. The species infesting the roots of the apple is called *Pemphigus pyri;* a very similar species which lives upon the roots of several annual plants, has received the name *radicis;* these and some other species living beneath the surface of the ground are almost invariably accompanied by ants in the manner referred to, and inasmuch as the laws of warfare class all who are not avowed friends or neutrals as enemies, we need not hesitate to deluge the little cattle and their keepers with strong soapsuds or lye, and by whelming the whole in one common ruin, save our trees a large unnecessary expenditure of sap. Two or three other species of this same tribe are found in immense numbers drawing their subsistence at the other end of the line. On the young shoots and small green leaves of the apple-tree, are found the *Aphis mali*, of Fabricius; the tender shoots and flowers of the cherry are frequently swarming with the *Aphis cerasi* of Fabricius. Those of the plum, the peaches, and other fruit trees, are often attacked in the same manner by other species. The aphis of the apple is quite dark-colored, with a greenish abdomen; that of the cherry almost or entirely black. Others, as the aphis of the rose, are of a pure green color. The aphides of the leaves and twigs are attended, like their brethren of the roots by an escort, or rather guard of ants. These cannot pitch their tents like the keepers of the root-lice, in the immediate vicinity of their flocks and herds, but are obliged, like larger owners of stock in outlying pastures, to make frequent visits to their proteges, and as from their exposed situation these are liable to the attack of enemies unknown to the subterraneans, their protectors maintain a constant watch, both by day and night, relieved with great regularity. Their duties are to remove the cast-off skins of their charge, and to drive away any marauder. It is a task of some difficulty, in many cases, to prevent the active and wily ichneumon-parasites from inserting their eggs in the bodies of the lice, and even the winged advantages of the former scarcely enable her to come off without the loss of a leg, left in the jaws of the enraged ant, while the lady-bird, the syrphus-fly, and the lace-wing are obliged to deposit their eggs at some little distance from the colony to avoid awakening suspicion, and trust to Providence for the safety of their future young. The latter insect, for the better preservation of her eggs, deposits each upon a slender stem of stiff and elastic silk, spun from her abdomen, of such a length that the ants cannot reach it, and so fine that they can neither cut it with ther powerful jaws, nor climb it.

How often, in passing a solitary hickory tree in the month of June, do we hear a buzzing as of hundreds of bees among its branches, and on looking up discover them, with wasps and flies without number, continually hovering and alighting and starting back from the green leaves, where no blossom or other supposable attraction is visible? Closer examination will discover myriads of minute plant-lice constantly ejecting the sweet honey-dew in such quantity as to stain and render the leaves absolutely filthy with this excretion. Ants innumerable, streaming up and down the trunk, and covering the leaves, now stroking the backs of their little purveyors, and now rushing valiantly forward to the great discomfiture of some eager wasp, who hoped to make a delicious repast on the abundant sweets, and had not the slightest intention of injuring the feeble aphides. This tree, after nightfall, becomes a centre of attraction to various moths or night butterflies, and furnishes a "rich collecting ground" to the entomologist, who, armed with his net, attached to a stout pole, jars from its boughs a shower of delicate creatures of various plumage, and captures them for future study. The leaves, on trees and other plants attacked by the aphis very generally attract attention by being more or less curled or turned backward, and their surface, as well as that of the twigs, frequently becomes blackened and dirty. Dr. Fitch, of New York, in his invaluable report states that washing the bark with a solution of sal soda, not only removes this filth, but being absorbed by the sap, the tincture becomes unpalatable to the aphides, and causes them to desert the tree. A writer of some experience recommends syringing the trees with lye, or soapsuds, which destroys all insects that it touches, but as many are protected by the curled leaf from the action of these preparations, the bending down of the branches where practicable into a tub of strong suds, is more certain in its effects. Rubbing soft-soap about the trunk and limbs, two or three times during the season, is approved by some. A small garden engine, or even a cheaply constructed syringe that can be made by any prentice tinman, is a convenient instrument, a tube, fifteen to twenty inches in length, and two and a half in diameter, closed with a perforated cap of tin at one end. The piston or plunger can be whittled out in a few minutes, an old broom or hoe-handle, wrapped with tow or rags, answering every purpose. This simple machine will be found very useful in throwing various solutions upon foliage that could not, otherwise, be reached, and will last, with proper care, for years.

On the bark of the apple, the pear, the plum, and the grape we find, frequently, minute and singularly formed creatures not so much resembling an insect as a scab or scurf, and so closely adherent to the bark and resembling it in color as to appear like a mere evolution of its cuticle. These little animals are called *Coccidæ*, or scale insects, and are arranged in different genera or groups according to their structure, habits and metamorphoses. Although differing in external appearance so greatly from the aphides of the roots and branches, they are yet of the same class and derive their sustenance in the same manner from the sap of the tree, being furnished with beaks or siphons of a precisely similar construction. The species inhabiting the apple, is of the form of the muscle-shell, about one-tenth of an inch in length, and of a brownish color. Their eggs are laid or rather extruded beneath the body of the female, which then shrinks up into the concave shell, and in death continues to protect and shelter the future brood. They hatch about the last week in May, or a little later, and the young scatter in different directions upon the trunk and limbs. This seems to be the time to remove or destroy them to the best advantage, as their tender bodies are very susceptible to such applications as soap-suds or lye. Some, however, prefer to brush or scrape off the parent shells and the loose, rough bark together; a hard rubbing of the smaller infested limbs with coarse cloths, if faithfully attended to is very efficacious. Dr. Harris recommends the application of a wash made of "two parts soft-soap to eight of water, brought to the consistency of thick whitewash by the addition of lime;" "a solution of two pounds of potash or a quart of common salt in two gallons of water will also destroy them." The grape is attacked by an insect of this family, of a larger size and of a more reddish brown color and rounded form than the apple scale; these will be frequently found at the junction of the smaller branches with the stem. In the State Cabinet there are specimens of scale insects both from the vine and the pear tree, which are very closely related to, if not identical with the *Coccus cryptogamus* of Dalman, and may have been introduced from Europe upon imported fruit trees. The actual shell of the female is quite small, of a reddish brown color; but the object which most readily attracts attention is the flattened scale seemingly composed of a dirty white wax, very thin, and of a more rounded outline than the apple scale, resembling somewhat in form one valve of the oyster shell; one extremity of this carries the female's body-case, and other shells are seen scattered upon and adhering closely to the bark in the vicinity. Dr. Harris considers these the pupa cases of the male. The whitish scale is composed of the excretions from the body of the female, and serves to shelter the young in the same manner as the entire case of the female apple scale. The adult males of most if not all of the *Coccidæ* are extremely minute, but furnished with wings and other organs as perfect in their microscopic details as those of the largest insect. Our oaks and other forest trees are frequently attacked by other species of these little sap-suckers, varying somewhat in form, but all easily recognized as belonging to this class, and the remedies to be applied are the same already recommended for those of the apple. Some insects of this group are extremely useful to mankind in the arts and manufactures. The Cochineal, a bright red dye too well known to require description, is produced from the bodies of the little *Coccus cacti* of Mexico. The Shell-lac, from which sealing-wax and several valuable varnishes and cements are made, is the secretion of the *Coccus ficus*, and the sweet and nutritious manna of eastern fame is deposited by the *Coccus manniparus*.

In continuing our investigation of the insect exhausters upon the apple-tree, we occasionally discover a light brown, flattish bug, of gigantic size compared with his congeners we have been examining, being about half an inch in length, and furnished with the invariable weapon of his tribe, a jointed tube bent beneath him, or inserted in the tender twigs, and sucking busily away as if his life depended on it, which indeed it does. He is intimately related to the squash-bug, and to those other delicious morsels which we often eat on blackberries and raspberries, and has, like them, a sort of Ethiopian odor, of which he makes no secret when handled. He is of rather angular outline, approaching a pentagonal or five-sided form, and belongs to the large group called *Pentatomoides* from their peculiar cut, and to the still larger one *Scutata* from the immense size of the *scutel* or shield-shaped plate which fits into the triangular space between the thorax and the folded wings, and in most insects is of very insignificant dimensions. In his case, however, it is about one-half of the breadth of his whole body, and not far from a third of its length. His wings are neatly folded over each other at the point, but if we raise them with a pin, we find that the half of the upper wing nearest the head, is of a firm, stiff texture, and the rest as fine and thin as those of fly or wasp. From this in connection with his other idiosyncrasies we learn that he belongs to the true bug-order, the Hemiptera or half-wings of some authors, and the Heteroptera or dissimilar-wings of others. If he were subject to like passions with ourselves, he might well be proud that his order had furnished the popular American title of bugs to so many other insects which have no legal claim to that distinction. Far from exhibiting any vanity, however, he is merely thinking of making his escape ; and if not checked in his mischievous career, by the timely pressure of the thumb and finger, or if his captor be fastidious, the boot-heel, will be off in an instant to some other tree to found a new colony. On the lower side of a green leaf his spouse makes her preparations for the expected addition to the family.

"Unseemly stains succeed; which nearer viewed
By microscopic arts, small eggs appear,
Dire fraught with insect life; alas! too soon
They burst their filmy jail and crawl abroad,
Bugs of uncommon shape—"

very much like their respected parents, in all but size and wings; and blest with a remarkable appetite. This they immediately set about satisfying, and never being weaned, keep up a continual sucking, till overtaken by the fatal shower of soap-suds or kerosene. These deadly poisons to their whole race will reach them, even if snugly clustered beneath the broad leaves of the squash-vine, or clinging to the topmost waving twig of the apple-tree. Even their more active cousins, the leaf-hoppers, who feast uninterruptedly upon the succulent leaves of the vine, and at the slightest alarm, spring off in a glancing shower, may yet find their shady retreats invaded by an oily flood they can neither stem nor stomach.

But the exhausters of the sap are only a part of the great army that forage upon our apple-tree. While these are levying contributions upon the milk and honey, another detachment is cutting off the wood, another stripping it of its foliage, and still another drawing an extensive internal revenue from its fruit. Let us look, for a time, to the main body, who, by their heaps of saw-dust, must have been long engaged. Near the surface of the ground, we find little concretions of reddish castings adhering to the bark, or piled up in a heap, on the ground, beneath a small hole, from which the sap is exuding. These are chips, and the excretions of the apple-tree borer, the two-striped or white *Saperda*, a very handsome, long-horned beetle, of a bluish-white color, with three chocolate-colored bands upon its back, extending from head to tip, and a little less than three-quarters of an inch in length. He is not so often met with in his beautiful adult condition, because he flies only by night, and after his change from a motionless pupa to a winged and active beetle is effected, he waits until after dark to make his exit from the larval burrow. If a sharpened wire, barbed near the point, be inserted in the small opening indicated by the castings and twisted about, it will very often bring forth the fleshy, whitish larva. Or, by cutting away the bark and the wood, around the hole, with a knife or gouge, the grub may be exposed and extracted. It is supposed to continue in its young or larva state from two to three years after the egg is deposited, nearly all of this time being employed in gnawing away the wood of the tree, and enlarging its residence. In this stage, it is a pale-yellow, cylindrical grub, less than an inch in length, and a quarter of an inch in diameter, at the broadest part, just behind the head. This is of a polished brown, furnished with black jaws or mandibles, and with a few scattered hairs. On each side of the body, nine spiracles or breathing pores, of a brown color, are distinctly visible. It is sought with eager avidity by the woodpeckers, who, by tapping on the tree, discover the hidden burrow by the hollow sound, and with their powerful beaks soon dig it out and devour it. We can greatly assist the woodpecker in relieving our apple-tree of the borers, if we rub the bark with soap in early spring, not once, but repeatedly, especially after a rain. And we should not confine this operation to the lower part of the trunk, but make a faithful application also to the axils of the lower limbs, for this borer, if eggs have been laid thickly near the ground will not risk the danger of starving its progeny by adding other mouths to the superabundance of eaters at this spot, but seeks other places higher upon the tree. These corners or notches, also, are the favorite haunts of other species of harmful insects, and the simple application of soft-soap, rubbed well into the bark, will not only destroy such eggs and larvæ as may be already there, but will also deter others from depositing their young in a place which their instinct shows them to be unsafe.

Another borer of different appearance, the *Buprestis femorata;* a flattened oval metallic beetle, with much shorter antennæ and feet than the preceding is frequently found in the same localities. Its habits are so similar to those of the saperda that the same remedies prescribed for that will be found available also for this. The larva is much more flattened than that of the other, and its outline bears a striking resemblance to that of a battle-door or round-headed gimblet-screw, rapidly tapering as it does from a broad, flat segment back of the head to a narrow and rounded tip. It is of the same yellowish color and fleshy character as the last described. These two borers belonging, the one to a group nearly related to the snapping beetles, the parents of the destructive wireworm, and the other, a type of the *longicorns* or long-horned beetles, are good representatives of a numerous and highly injurious class of insects. All of these attack, in a not dissimilar manner, the fruit, forest, and shade trees.

One of the most hurtful parasites of the peach is the *Buprestis divaricata*, a burnished, coppery beetle, of elliptical form, with wing covers, which spread apart at the tips, measuring about four-fifths of an inch in length. This insect attacks also the wild cherry, and sometimes is found beneath the bark of the common cultivated varieties. The largest species of the group inhabiting the United States is found quite commonly in New England, preying upon the different species of pines, and averages over an inch in length. The first specimens on record were received from Virginia, by an English collector of insects, Dru Drury, who described and named it from this circumstance, *Buprestis virginica.* The beetles of this class may be readily distinguished by their compact and more or less elliptical form, their short, stout feet, and their short, saw-toothed antennæ. They are in general of a brilliant metallic lustre, and some of our own species, as well as in a greater degree those of tropical countries, resemble precious stones, from the wonderful beauty and variety of colors with which they are adorned. The long-horned beetles are very numerous in their species and forms, but can scarcely fail to be recognized as belonging to the borer family, by any one who has devoted a few weeks, even, to the collection and study of insects. Some of the most insidious enemies of the pine-tree belong to this class, and two or three of our New England species have antennæ of three and four inches in length. The largest species known is found in South and Central America, and frequently measures from the tip of its fore feet to the end of the abdomen, ten or twelve inches. We do not dwell at any length upon these borers, because the mode of attack and the signs of their presence in trees are so much alike that the means of destroying them need be but little varied. Perhaps one of the little group of bark beetles has made a lodgment beneath the bark of our apple-tree, and perforated it with numerous little punctures, as if made with a pin. On removing the bark, which is easily done, for the little creatures have almost separated it from the wood, we find an infinity of small cylindrical burrows, running between the bark and the wood, and in them many little reddish-brown and black beetles, scarcely one-tenth of an inch long, very much resembling a very short bit of fine wire, so closely does the thorax fit to the wing covers, the head being almost concealed and the feet very short. This insect has been named by Dr. Fitch, *Tomicus mali*, or the bark-beetle of the apple.

Another of this group, the *Tomicus pyri*, of Peck, or pear-blight beetle, injures the trunk and the twigs of the apple, pear and other fruit trees in a similar way, and even continues its excavations deeper into the wood, commencing its operations close to a bud where the egg is laid. It is of similar appearance to the last species, but about twice its size. Some of the burrows and galleries mined beneath the bark by this group of minute creatures are of singular regularity, one excavating a perfectly straight gallery for several inches, and then constructing little cells, or short burrows on each side, like courts, leading into a main street. The burrows of another species from their resemblance to letters, have obtained for it the name of *typographus*, or the printer bark-beetle. In some cases, the injury done by these little animals is so great that the only remedy seems to be the cutting off and burning of the limbs affected, but where the possibility of preventing it occurs, we shall find the thorough painting of the twigs and branches with thick soap-suds especially useful. With low branching trees, this may be easily done before the leaves have made their appearance, and the dipping of the ends of the shoots into a pail of the mixture, will better insure this reaching into every joint and crevice. When the tender leaves unfold their green surface to the spring sun, and begin to breathe in the warm and exhilarating atmosphere through every pore, starting the sap to renewed life, and increasing in size and beauty every hour, we find hundreds of hungry creatures, ready and anxious to begin their work of devastation and revel in the rich supply of succulent food spread out before them. Among the first are the little web-worms, or tent caterpillars, who have escaped from their winter quarters a day or two before the leaves, and have been living since then upon the nutritious gelatine, which their mother provided some eight or ten months before for the double purpose, and spread over the embryo brood to serve as a warm blanket through the winter, and two or three days rations in May. These leave the cluster of eggs, and advancing to the nearest fork select an eligible camping-ground, and pitch their modest tent. The leaders then depart on a foraging expedition, being very careful to leave behind them a delicate silken clue, that they may find their way home when they have obtained supplies. They soon discover the delicate foliage, and fall ravenously to work, reinforced every moment by stragglers from the rear, directed along the limb by the silken thread of their bolder brethren, which increases in breadth and thickness with every traveller, who is particularly careful to keep up the condition of the highway. In a few hours they are stuffed to repletion, and are obliged to return to camp, and let out their now outgrown uniforms, which they do by splitting them down down the back, and leaving them in a corner of the tent. Having fallen upon a fertile source of supply, their extravagance increases, and their tent must be enlarged, while their cast-off garments, and the refuse of their meals are scattered through it in every direction. A few days elapse, and detachments are sent out in various directions, with instructions to subsist on the country, and hold the outposts. No rations are furnished them, for supplies are already becoming exhausted, and the energies of the oppressed foliage are taxed to the utmost, while the almost invisible silken footpath has grown to a broad highway, stretching like a silver ribbon up the branches, and already sending off lanes and by-roads, in various directions, one, in particular, of respectable proportions, down the main trunk from the camp to the spreading lower branches, or, still further, to the flourishing growth of suckers springing up from the roots of the persecuted tree. New camps appear as if by magic in unexpected quarters, and if the approaching aid of the long-handled mop, dipped in kerosene or some other timely preparation be delayed, the crop is doomed. The naked branches, sprinkled with the ashes of departed leaf and blossom, and the ghastly standing tents of the destroying army, ragged and fluttering in the breeze, occupy the place where ruddy and golden fruit would else have gladdened the eye and pocket of the proprietor. But let him know in December the immense significance of those little varnished bulbs of eggs on the slender leafless twigs, so clearly seen against the sky, and with his ladder and pail, or close-woven basket, he mounts the tree, and forestalls the intentions of the embryo invaders by collecting and depositing them safely in the kitchen fire. Then, when his less informed or more indolent neighbors are lamenting their vanished prospects, or hurriedly snatching an ill-spared moment to endeavor to arrest the wholesale destruction, he can enter calmly into the various employments of the spring, while his fresh and blooming trees all the greener and fresher by the contrast, proceed to fulfil the promises of autumn wealth.

These ravenous insects pertain to a group called *Bombycidæ*, or silkworm moths, which are generally distributed through the globe. The adult insects are frequently of the largest size, and of variegated and brilliant colors, the wings of some containing large membraneous transparent spots, devoid of scales, and presenting a singular appearance; the species from whose coccoons the silk of commerce has been hitherto obtained are of plainer colors, generally approaching a dirty yellowish white, and of smaller size. Experiments which have recently been made in this country, seem to prove that one or more of our common native attaci are capable of producing silk of the finest texture and great strength. Dr. J. G. Morris, of Baltimore, has been very much interested in developing the capabilities of the *Attacus cynthia*, which feeds upon the ailanthus tree, and M. Trouvelôt, of Medford, in this State, has demonstrated that the *Attacus polyphemus*, which feeds upon our commonest forest trees and shrubs, produces a beautiful silk in greater quantity than the original silkworm, and at far less expense to the cultivator.

Our apple-tree is frequently attacked by the largest American Bombyx, the *Attacus cecropia*, which appears in the form of a peagreen worm, or larva, about three inches in length, ornamented with little knobs, or warts, on the back, of blue and red. It seldom occurs in sufficient numbers to prove very injurious, but one larva devours several pounds of foliage before coming to maturity, and when discovered should receive the usual treatment of an enemy. It is rare, however, that more than one or two are found upon upon a single tree. The moth frequently measures six and a half inches from tip to tip of its expanded wings, and is of a dusky grayish brown color, spotted and banded, with a variety of colors, the most conspicuous of which are dull red and white. The antennæ of both sexes, are finely pectinated or toothed like a comb, on both sides, those of the male being very much the broadest, and resembling some beautiful fern-leaf.

One of the vaporer-moths, the *Orgyia leucostigma*, which is very hurtful to the elms, horse-chestnuts and other shade trees, is occasionally found upon the apple in sufficient numbers to prove mischievous. Its larva is one of the most gaudily attired of all caterpillars, being of a bright yellow, clothed with fine, long yellow hairs upon the sides, with the head and two little warts, toward the end of the body, bright coral-red, and three spreading black plumes of long hairs, two just back of the head, and one at the other extremity. The male moth, on the other hand, is of very plain, almost quaker-like appearance; having ashy gray wings, variegated with somewhat darker bands, and a small white spot on each fore-wing near the hinder angle, from which it derives its name; its antennæ are of a widely pectinated form, curved like a bow. The female is wingless, like that of the canker-worm moth, of which we shall presently speak. She deposits her eggs on the surface of her hairy cocoon, and covers them with a white, frothy matter of a water-proof character, never stirring from the spot where she has lain as a chrysalis save to provide for her future progeny and die. The empty cocoons and the eggs may be readily distinguished during the winter and should be removed and burnt. The elms on Boston Common are much infested by them, and men are regularly employed by the authorities to brush them off, and wash the bark of the trees with a mixture of clay and soap-suds.

In August and September we sometimes find a whole branch stripped of its leaves by a swarm of round, yellowish larvæ with darker longitudinal stripes, and black heads with a yellow collar; if disturbed, they raise both ends of the body from the leaf or twig, clinging only by the two or three pairs of feet about the middle. These are produced by the *Eumetopona ministra*, a buff-colored moth, with brownish bands upon the wings, and a rich, dark brown or reddish velvety patch just back of the head; who lays a score or more of white, rounded eggs upon the under side of a leaf in July. Attacking the leaves in the same manner and at the same time as the last, is frequently noticed a very prickly caterpillar, black, with yellow and white stripes, and with a curious hump rather forward of the middle and the head of a bright red. The thorny prickles are black and disposed in four rows, two quite regularly upon the back, and a shorter irregular one upon each side. The parent moth of which, both sexes, are winged, is of a light brownish color, the wings somewhat darker, with a gray margin. The lappet-moths, whose caterpillars are of a singular, half-round form and of a grayish color, resembling, and so closely adhering to, the bark, as to appear like a mere swelling or protuberance, are sometimes guilty of preying upon the apple, but on account of their scarcity need not be much dreaded.

A far more terrible and destructive enemy, not only of the apple but of almost every other tree and shrub in the localities where it has established itself, is the canker worm, *Anisopteryx vernata*, of Peck. It has long been known, and hundreds of remedies, more or less fallible, have been proposed and tested for its extermination. Their failure may be attributed in most cases to the want of a thorough acquaintance with, or a neglect of taking advantage of the habits of the insect. As the period during which the wingless female emerges from the ground and ascends the trees to meet the winged male, and deposit her eggs, extends from the last of September, through the mild days of winter and the month of March, it is evident that impassable barriers must be kept up during the whole of this time to make the remedy effectual. And as the young larvæ, when hatched from the egg, are of totally different form and structure from their parents, the same obstacles will not avail to prevent their ascending the trees and commencing their work of devastation. Accordingly before the first of May the trunks of such trees as have been effectually protected by troughs of oil, collars of tin, or belts of tar, must be *thoroughly* soaped or washed with the soap or oil from the point occupied by the protector to the ground, to destroy the eggs which have been laid on that portion, the clusters of eggs upon the fences and buildings in the vicinity removed and burned, and all shrubs or unprotected trees carefully examined or treated with the preparations before recommended. The children can be readily taught to discover and remove the eggs in their leisure hours, and will take a hearty interest in this sanitary measure, especially if a small sum, by way of reward, be offered for an ounce or a pint of the eggs. They are laid in clusters, and a thin-bladed knife, removing also a chip of the bark or wood to which they are glued, will be found the most convenient instrument for the purpose of separation. It should be distinctly impressed on the minds of the children that the eggs must be sought for on all woody shrubs and trees, as well as on all perpendicular objects, such as fences and buildings, and that if any are dropped or spilled on the ground in the process of removal, they should be collected with the others in pails, boxes or tight bags, and *burned.* A single season's trial faithfully carried out will convince any one of the efficacy of this somewhat tedious, but simple remedy. As the canker worm, fortunately, spreads but slowly through the country, many of those present have not had actual experience of their ravages or even seen the insect itself. The male moth has light gray silky wings expanding about one inch and a quarter, the front pair darkest, and banded with blackish and white zigzag lines. The female, as has been stated, is wingless, with very slender feet and antennæ, of a light gray color beneath, and darker above, about a third of an inch or more in length. The larvæ, or worms as they are vulgarly called, vary much in color. The young are of a dusky hue above, striped with yellow on each side, and whitish beneath. When fully grown, according to Harris, some are "ash colored on the back, and black on the sides, below which is the pale yellowish line. Others of a dull, greenish yellow, and others of a clay color, with slender, interrupted blackish lines on the sides and small spots of the same color on the back. Some are green, with two white stripes down the back. The head and feet partake of the general color of the body. They are about an inch in length, and move by drawing the hinder part of the body toward the head, thus forming a loop. The insects which have this habit are called Geometers, measurers, or span-worms, and are a numerous group of great destructive powers. The cheapest, and perhaps most convenient applications to prevent the moths from ascending the trees, are strips of paper or cloth covered with tar, or what is better, melted Indian rubber, daubed on with a brush, and tied about the trunk three or four feet from the ground. These applications must be kept soft and sticky, for if a pellicle or skin forms on the surface, they will prove no obstacle. Several contrivances have been invented, more or less expensive and ingenious, to effect the same end, such as troughs filled with oil or salt water, conical collars of metal, &c. I have lately examined a very neat, and apparently effectual collar, composed of glass of the form of an inverted gutter, and attached to the tree by an iron hoop and tent of cloth, the invention of Mr. Benjamin Merritt, Jr. This will, no doubt, prove very valuable, as it opposes a practically impassable barrier to the female moth, if the expense does not prevent its introduction. If we are successful by any of these appliances in preventing the ascent of the mother, we must, as previously stated, remove the eggs outside this cordon, before the first of May, or all our labor and expense may prove in vain.

Notwithstanding our patient care and perseverance has preserved the tree thus far, we are still liable to the depredations of certain little creatures which attack the fruit.

A moth, nearly related to the destroyers of our furs and carpets, deposits her eggs in the calyx or blossom end of the young apple, about the end of June. The eggs in a few days give birth to small, white caterpillars, with blackish heads, which burrow into the core and open a hole on the side, through which they eject their castings. This injury causes the fruit in about three weeks to become prematurely ripe and fall to the ground, soon after which the grubs leave it and make their cocoons in crevices in the bark. The first record we have of its depredations in this country, is by Mr. Joseph Tufts, of Charlestown, who discovered it in a St. Michael pear. It has since proved very destructive also to cranberries. The moth is described by Mr. Tufts as having the upper wings of a light slate color, crossed by wavy bands of a darker shade, towards the tips of each, an oval spot of a burnished coppery lustre will be seen, the feet, antennæ, and body beneath, are of a light gray; it expands about three-quarters of an inch. The thorough rubbing of the trees with soap or the scraping and brushing off the rough bark in the late fall or early spring, will be found very serviceable in ridding ourselves of this insect; but the collecting daily of all worm-eaten windfalls, boiling them, and feeding to the cattle or swine has proved most effectual. A small, white, tapering, polished maggot is very destructive to some varieties of the apple. I have found it most abundant in the Porter, and not uncommon in several other kinds when ripe, especially those of thin skins. It is the young of a *dipterous* insect, or two-winged fly, belonging to the same order as the pernicious Hessian fly and wheat-midge. Dr. Fitch has described this insect under the name of *Molobrus mali*, or the apple-midge. The adult is little more than an eighth of an inch in length, almost black above, yellowish beneath, with hyaline, smoky wings. They are supposed to attack only those apples which have been previously penetrated by the last mentioned insect, the coreworm, so that the same remedies will be applicable to both cases.

Within a few years it has been noticed that the common plum-weevil or curculio has extended its depredations to the apple, and several other fruits, as well as to that from which it derives its common name. The perfect insect is well known to the majority of horticulturists as a dark brown or blackish beetle, with long snout, about a fifth of an inch long, and simulating death when disturbed, folding its feet and beak beneath the body and presenting the appearance of a bud. The larva is a small, whitish, footless grub, which bores into the interior of the fruit, producing the same effect as that of the coreworm. The remedies hitherto proposed, have been to syringe the fruit with whitewash, strong soapy water, or other offensive preparations; to collect and treat the fallen fruit as recommended for the coreworm, to jar them frequently from the trees, turning in the swine and poultry at the same time, &c. If, as Dr. Fitch suggests, however, the larvæ live during the winter, beneath the outer bark of the smaller limbs, their presence may be easily detected by the crescent-shaped marks on the outside, and the spring brood annihilated by burning the limbs or thoroughly rubbing them with soap.

I have mentioned already only a part of the insects which infest our fruit-trees, and have endeavored to give some idea of the great variety of habits, among the number of voracious creatures, for the support of which the farmer and gardener are annually taxed. But as my space is limited, I will proceed to recapitulate a few of the best methods of destroying these pests, or preventing their ravages by rendering their food unpalatable.

Firstly, we should make ourselves acquainted with the particular species, and the time and manner of their transformations, (by actual experience if possible,) in order to take them in the weakest and most accessible condition.

Then, if caterpillars attacking trees, remove and burn the eggs, or thoroughly soap the trees to prevent their being laid, kill them if already laid, or hang bottles of sweetened water about the trees to entrap and destroy the perfect moth.

If borers in the trunk or branches, soap the bark, (soft-soap made cold is, perhaps, the best preparation, and if mingled with a strong decoction of tobacco it will not be less effective.) Dig out the borers with knife or gouge, or pour boiling water, or petroleum, into their holes, making sure that it reaches the insect.

If insects on the leaves or fruit, syringe the trees with any of the preparations previously recommended, soap-suds, tobacco-water, &c. Jar them frequently, giving the pigs and poultry a chance to pick up and devour those which fall. Hang pieces of cloth or paper dipped in kerosene, in the branches, renewing them every few days.

For insects upon roots and bulbs, sprinkle petroleum along the rows, or water them with strong soap-suds; for onions, mingle common soot, or pyroligneous acid with the solution.

For squash and cucumber vines, &c., scatter paper-rags, saw-dust, or other absorbent materials, soaked in kerosene, about the hills, sprinkle the leaves with road dust, air-slacked lime, ashes, or powdered herbs known to be offensive to the insects. The Persian insect-powder, which has proved quite useful of late years, is composed of the pulverized leaves and blossoms of a species of fever-few, the *Pyrethrum carneum*, closely allied to the common camomile. It would be really worthy of experiment to collect, dry and powder the flowers of our common ox-eye daisy, or white weed, so common through the country, and ascertain the effect upon insects and slugs which attack our broad-leaved plants, as well as upon the moths which infest furs and woollen cloths.

Chloride of lime, freely scattered upon the ground among growing vegetables, gives off a gas which is extremely noxious to most insects, without injuring the plants. Coal tar is also quite serviceable in some cases.

For field crops, the most feasible plan is, by rotation, to starve out the destructive millions that prey upon one variety, devoting the land to some other crop for two seasons before returning to the original one. Small fields of wheat, rye or oats may sometimes be saved from immediate injury by building a line of fires on the windward side, and burning scraps of leather, wet straw, and such substances as emit a thick, offensive smoke. Two persons, on opposite sides, with a cord reaching across the field, have swept off and destroyed some insects by drawing the tightened cord across the heads of the grain.

It is highly necessary to bear in mind the importance of faithful and concerted action in experimenting upon the destroyers of our crops, as the labor and expense bestowed by one farmer in ridding his land of these pests will avail but little if his neighbors do not second his exertions. We must ourselves try various remedies, and thoroughly test even those backed by the best authorities, before discarding them as too expensive or laborious. But one fact is indisputable, namely, that the birds are our friends. Let them take a few of our early fruits, or devour a part of our grain, they restore it a *hundred fold.* Very few of us, perhaps, have not already learned this, but those that still persist in destroying and driving the birds from their premises, will eventually acquire this knowledge in the dear school of experience. Moles, toads, and snakes, are all feeders upon insects, and never claim any part or reward in the vegetable productions of the farm.

In conclusion, I would say, that, although the insects mentioned in the foregoing remarks are not a tenth part of the enemies of our crops, I have endeavored to select, as far as possible, representative cases to illustrate the transformations and ravages of the class. To all who may wish to pursue this subject further, I shall be happy to afford any information in my power, by identifying specimens or otherwise. Communications may be addressed to me at the State Cabinet, Boston, and specimens preserved in vials of alcohol, or pinned in boxes, will be very acceptable to the instructive collection I am engaged in preparing.

SHEEP-HUSBANDRY.

The subject of sheep-husbandry was then announced for discussion.

Mr. PERKINS.—I am not prepared with any definite remarks on this subject. In relation to the breeding of pure blood sheep, I shall leave that mostly to those who have had greater experience. It is not possible, probably, for us all to breed pure blood sheep, at pure blood prices; because those who consume mutton must have mutton to eat, and they cannot afford to pay Vermont prices for Merino sheep to put on the table. They do everything up in Vermont but eat sheep. They do not eat full-blooded Merino sheep, when they can sell them for from $50 to $1,000 apiece—and the $50 ones are exceedingly scarce. The prices they get for sheep there are perfectly astonishing. One man was offered, lately, $10,500 for eighteen yearling ewes, which he refused, and was afterwards offered $13,000, but held them at $18,000. The sale of sheep, this fall, has exceeded everything that has ever been known before. In the town of Orwell, the average price put upon the sheep by the assessors was $50 a head. Now, the average price here in Massachusetts is put down at only about $27. Sheep, under these circumstances, are worth infinitely more, in Vermont, than real estate; and, as I have remarked, we cannot all be growers of full-blooded sheep at these prices, and still supply the cities with mutton. I am satisfied that a person who wants to get the greatest return for his money and labor will deal in Merino sheep. I don't think that an epicure can tell Merino from Southdown mutton, if both are equally well kept. I keep the common, open-faced Merino ewes, and I have put a coarse-woolled buck with them. When wool was worth from thirty cents to sixty cents, my wool brought forty-seven cents. These sheep would shear from three to three and three-quarters pounds apiece, besides bringing their lambs; and these lambs, when coarse-woolled lambs were bringing $3 for mutton, would bring $2.50. My opinion is, that seven of these large, coarse-wooled ewes will eat about as much as ten of those I have. I believe the Merinos are the best to keep. They will cluster together like pigs. If a man is keeping a large lot of sheep, he must have some Merinos, or he will not be successful. I got an average of $3.35 for the wool from my ewes this year, and $4.80 for the lambs for meat, which makes about $8. There is no fictitious value in these sheep; it is the market value of wool and mutton. It is a thing that we can all go into.

Now, in relation to the cost of keeping sheep, I had the pleasure of listening to a lecture from ex-Governor Boutwell this fall, and he stated that a man in Wilbraham, thought they could be kept for one dollar and fifty cents a year, but he was satisfied they could not be kept short of three dollars. A few years ago, I could hire them kept through the winter for a dollar a head; this year, I can hire them for from two to three dollars a head. The expense of summering them, where I live, is merely nominal.

I think I can make more money by dealing in sheep, by buying and selling, raising mutton and lamb for sale, and selling wool, than I can by breeding. If I go to breeding, I cannot buy and sell with my neighbors. I believe it to be for my interest, and for that of a great many, to traffic, but it is for the interest of some to deal in these thoroughbreds, and I presume there are those here who are dealers in them.

Mr. Smith, of Middlefield.—I think the Merino sheep are the most profitable to keep in the western part of Massachusetts, where land is cheap, and they can have a large run, but in the eastern part of the State, it is altogether different. I have taken some pains in breeding Merino sheep, and I am fully satisfied of their hardiness. I have taken the ground always, that if a man wants to keep a large number of sheep, he had better keep the Spanish Merino. I think they are the most profitable. I have tried the Saxony, the Silesian, and the French Merinos, and I am fully satisfied the Spanish Merino is the best we have. I have gone somewhat extensively into the improvement of sheep for my section, and I have used a Vermont buck. The sheep in our section are not so far behind the Vermont sheep, after all, as we are apt to think. I do not claim that they are as good, but the difference is more in the attention and care they receive than anything else. I had occasion at one time to send to Mr. Hammond for a buck; and for my own gratification, I ordered a ewe. This was when my sheep were at the highest point to which I had ever got them, and I sent for this ewe to see how their sheep would compare with mine. It was six years ago, and I paid twenty-five dollars for the sheep. Such a sheep would sell readily now, I presume, for one hundred dollars, and perhaps more. I thought I would know the value of this sheep. I served her just as I did my other sheep. We live in a country where we cannot raise grain; it is grass, and hardly anything else but grass. We raise pretty good cattle and sheep, but we raise them on grass almost entirely. I put this sheep in with my flock, and let her run. In the spring I sheared her with the rest, and she sheared the most of any, with the exception of one; but you see she had been kept in Vermont until the middle of November. Well, she went out to my pasture the same as my other sheep, and the next year she did not shear quite up to the average of the flock. I kept her two or three years, and I did not consider her an average sheep. She certainly was not an average in the quality of her wool; and I have generally found, that our sheep in Western Massachusetts yield a better quality of wool, nicer, softer wool, than they get in Vermont. There are exceptions to that, but that is the general rule. A great deal is owing to the care. I don't do as well by my sheep as I think likely it would be profitable to. I think if we kept less cattle and sheep, and kept them better, we should make more profit. That is the great secret of the superiority of Vermont sheep. Now, in regard to our sheep, we let them run about as long as they will live, and then put them up and feed them with hay. We let them run in rain storms, which are worse for sheep than snow storms. In Vermont, they house them in storms; and if a person is situated so that he can, it will pay, but he cannot with pastures from two to seven miles from home. This care adds a great deal to the weight of wool. I presume there are men within the sound of my voice who have bought bucks that have sheared enormous great fleeces, and yet they have never been able to get them up to the point they had reached before; they do not understand keeping them up to it, as the Vermont breeders do.

One great point to be looked at in selecting sheep is to see that the wool runs all round them. You can get about as good wool on the belly as on the back, if you work at it carefully. It is a matter requiring a great deal of care and attention, like everything else in good breeding. One of the first things I thought of, was to get the wool on the belly long. I didn't see why there should not be wool on the belly as well as on the back; I found there was a difference in sheep in that respect, and so I selected with reference to that, and I have had sheep that I have never seen excelled, in that respect.

I don't think the largest Merino sheep are the most profitable for raising wool. I want short-legged, compact sheep. They are more quiet, more apt to do well, and it is less trouble to take care of them than of the long-bodied sheep. I have sheared between six and seven pounds from a carcase that would not weigh more than forty pounds. Take one of these sheep that shear twenty-five, thirty, or forty pounds of wool, and you would think such a fleece would clothe all your family, but when you cleanse it, and bring it down to the cards, you get but little wool. I think that four pounds would be a very large average of cleansed wool for the cards. Possibly there may be six pounds, but I should doubt it, exceedingly. So you see, there is not, after all, the real value in these heavy shearers, so far as the wool alone is concerned. There is no question, however, that it is profitable to buy them for the purpose of crossing with other sheep.

I have seen it recommended in one of the governor's messages, that more sheep be kept in Massachusetts, as a matter of good husbandry, to bring up poor land. That was contrary to my experience, and to the experience of the farmers in our section. I once believed that sheep would improve a farm anywhere, but I have come to a different conclusion now. It is just as it is with all other stock. You want the kind of stock that is adapted to the locality. I am convinced that sheep are beneficial to some lands, but to other lands, to loamy, rather heavy soils, where we do not plough, they are decidedly injurious. I know they are a sure remedy for the white daisy. I defy a man to find any of the white daisy on a pasture that has been occupied by sheep for two years. Ten years ago, our people began to get sick of sheep, though they had made a good deal by keeping them. I don't think sheep manure is as good as the manure of cattle. Our grass grew short and fine on lands that are fed with sheep. Where the sheep manure was composted, I don't think it had that effect, but where it was not composted, our grass grew short and fine, and did not head out well. I think if a man wants to improve his farm, he had better keep cattle instead of sheep.

Prof. AGASSIZ.—I would like to ask whether there is any food which has been found by experiment, to increase the amount of wool produced by sheep.

Mr. SMITH.—I believe wheat will make the most wool, but, of course, we don't want to feed wheat. If I was going to feed to make the greatest amount of wool, I should feed oats; and you want a certain amount of lime to make a good growth of wool.

Prof. AGASSIZ.—Has the fineness of the wool been measured microscopically, with the micrometer, so that you can ascertain the fineness or thickness of a single thread of wool, and what is the production to the inch?

Mr. SMITH.—Yes, sir. The number of hairs of wool on a square inch has been determined, on different sheep, a great many times. I cannot give the figures now; my memory does not serve me well. The production of our sheep has been compared with that of European, and I believe it has been determined that we have sheep in this country that produce a larger number of hairs to the square inch than any that have ever been found in Europe.

Mr. HUNTINGTON.—I would like to inquire if the pods of beans and peas are not good for sheep. I believe they are very fond of them.

Mr. SMITH.—Yes, sir; and they are very good. The best sheep-growers in Vermont take up their ewes in October, and begin to feed them oats when they put the buck with them, and continue this right through until they lamb. That helps them to get a strong progeny.

I would like to make one remark in connection with what Prof. Agassiz said this morning with regard to the food of cattle. I have tried some experiments in supplying the deficiency of lime. I found that some of my cows, every season, after the middle of summer, began to chew bones, if they could get them; and I noticed this fact, that the cattle that did that, didn't seem to be very well; they seemed to be running down. In reading, I found what the trouble was. A great proportion of milk is phosphate of lime, and in making that every day, they need the food that gives it. They do not get it from our soil, because it is not there. I noticed this fact, also, that oxen never did this. I presume nobody ever saw a healthy ox chewing a bone; it is most generally cows that are in milk. Well, I went to feeding bone meal. I always keep a barrel of bone meal, just as regularly as I do my salt, and I feed it with my salt. I put in about the same quantity of bone meal that I do of salt. In winter, when they are eating hay and roots, there is not so much necessity for this. I have never had any trouble since I have done that.

Mr. Stebbins.—I will state, in regard to the manufacture of manure from sheep, that I have repeatedly made a big ox-cart load of manure with one sheep. The sheep is bedded thoroughly, and occasionally during the winter, tobacco stalks are put in ; and it makes as fine a bed of manure as the sheep would make if there was not a particle of matter put under it.

Mr. Fisk.—So far as my experience goes, I am altogether in favor of coarse-woolled sheep. Not that I expect to get so much money for the fleece as I should from fine-wool sheep, but our object is the rearing of lambs. Nothing has been said with regard to the profit of raising early lambs for the shambles. Now, the coarse-woolled lambs in Shelburne bring six dollars a head, when they are three or four months old. The last summer, I sold every lamb of mine, the first of July, for five dollars and seventy-five cents. They were dropped from the first of March to the fifteenth. Now, a Merino lamb must be kept all summer long, and then, as a general thing, must be sold for three and a half or four dollars.

A few years ago, I bought five Cotswold sheep, and gave one hundred dollars for them. I took them off nine miles, and put them on one of the highest patches of ground, but a good pasture, and they wintered there. They had a barn to go to out of the storms, but they almost always laid in the yard. They never had a particle of water until they commenced to have their lambs, about the middle of March, and then we carried them water. Previous to that time, they ate the snow, like the birds. Last winter, a friend of mine wanted to take a few sheep to winter, and I sent him up thirty coarse-woolled lambs, and thirty Merino lambs. They were kept on the same fare precisely, but last May, when I went up for them, the Merinos were all dead but ten ; while only two of the coarse-wools had died. I had to bring home the balance of the Merinos in my wagon, and they seemed to be struck with death, and some of them did die after they got home. A few only lived to linger out a miserable existence. They look badly to-day ; while the others have done remarkably well.

With regard to pastures, I am altogether in favor of stocking with sheep. There is no need of keeping one kind of animal on a pasture for a hundred years, as we have been told they do in Berkshire. I would not be guilty of pasturing cows or sheep three, four, or six years on the same pasture. Put your sheep into the cow-pasture, and your cows into the sheep-pasture,—make a rotation in that way, and you benefit your pastures at once. There is no kind of fertilizer that is equal to sheep manure,—it is of great value.

I have not been in the habit of keeping an exact account of how much it costs me to raise my sheep, but I know it don't cost me, to raise a Cotswold lamb, that will weigh, when dressed, one hundred and fourteen pounds, anything like the figures that have been produced here this afternoon. That is not an uncommon weight at all for a good Cotswold, but what I like full as well is an Oxford Down, which was produced, some years ago, by crossing a Southdown ewe with a Cotswold buck. That is the best sheep I know of. I find that it does not injure a Cotswold, Southdown, or Oxford Down ewe to have a lamb when she is a year old, only the lamb must not be allowed to run too long with its mother.

A discussion followed in regard to the present dog law. The general sentiment expressed was, that it was inefficient, inasmuch as there were so much trouble and expense necessary in order to secure the compensation provided by the Act, that farmers would prefer to lose their sheep rather than undertake to get pay for them in that way. Several instances were mentioned, in which selectmen had required such an amount of testimony as practically to nullify the operation and purpose of the statute. It was suggested in the course of the debate, that if the towns were made responsible for all sheep killed by dogs, without reference to the amount of tax collected from the owners of dogs, the town authorities would see that the law was enforced. It was also suggested, that if the farmers of the State would make up their minds that they must have sheep, dogs or no dogs, and that they would defend their sheep against dogs, there would be no trouble. Vermont was pointed to as an illustration of this point. Nobody, it was said, ever heard of a dog law in Vermont that amounted to anything, and yet there were millions of sheep in that State. The reason was, that there, sheep were superior to dogs, while in Massachusetts dogs were superior to sheep, and the farmers had made them so.

The discussion terminated by the appointment of a committee of three, on motion of Mr. Smith, consisting of Messrs. Loring, Taft and Stockbridge, to memorialize the legislature upon the subject of a dog law. The meeting then adjourned, to meet at half past seven o'clock in the evening.

Evening Session.—Met agreeably to adjournment, Dr. Loring in the chair. The hall was well filled by the ladies and gentlemen of Greenfield and vicinity, attracted by the fame of the distinguished gentleman who had been announced as the lecturer of the evening.

ORIGIN OF AGRICULTURAL SOILS.

BY PROF. AGASSIZ.

Ladies and Gentlemen,—I propose this evening to introduce the same subject which was discussed here yesterday—the origin of the agricultural soils of the Northern States. And in so doing, my intention is to show you how different may be the manner of treating the same subject, and with how different topics we may have to deal when inquiring into the same matter. During these few days, in the discussions of the State Board of Agriculture, I have witnessed a frequent disagreement in the statements of the gentlemen present who have taken part in the discussion, owing chiefly to the fact, that one class of facts related to one place, and the other class of facts to another place; and I want to lay before you the evidence, that the differences on our subject-matter may be owing to the fact, that though we treat of the same subject, we are considering it with reference to one locality, and not to another. Yesterday, Prof. Rogers gave you an account of the origin of the soil of that great belt of our country, which extends from the Atlantic across the Alleghanies into the great West. I propose to give you an account of the origin of the soil of the more Northern States; and you will see that I might have introduced this lecture by saying that I would discuss before you the glaciers of Switzerland. These two subjects seem to have no connection, and yet they are most intimately allied.

But before I enter upon the subject of my discourse, allow me to make a few rambling remarks concerning our scientific wants, or the wants of the community with reference to scientific matters. A few centuries ago, there were no schools in the Old World. In Europe, the mass of the people were deprived of education. What was then called education was the privilege of the few who had better advantages in society, and was chiefly of a religious character. What changes have taken place in that respect, especially on this continent! Here, in these United States, public education is one of the objects for which public munificence knows no limits. In the State of Massachusetts alone, there is spent annually for public education at least a million and a half of dollars; and for the moral education of the community, I take it the amount expended is quite as large. And yet, what do these two objects cover, of the matters of interest in which the community is concerned? The knowledge of our God and our relations to Him, and the knowledge of the concerns of man, as far as dealing with that which man can produce by his mind, acting with reference to himself. What is done for the promotion of a knowledge of nature? Hardly anything. A few years ago, by an act of unexpected liberality, the legislature of the State granted $100,000 for a Museum at Cambridge. It was an evidence of such unheard of progress in these matters, that the fact has been echoed all over the civilized world. Europe recognized that we were making a stride beyond her, because we had done that. Now, allow me to tell you what is the impression I have about this matter. I say it is a good beginning, but a very small beginning. It is hardly worth while to speak of it, if we look at what ought to be done, and what I hope may be done very soon. Do not think, while I speak so, that I am not truly grateful for what has been done, and do not fully appreciate the high-mindedness with which that first step has been taken. But why should there be less done towards teaching men what nature is than there is done towards teaching man what God has done for mankind? Why should there be less done for the knowledge of nature than is done in our schools to prepare men to appreciate the works of the human mind? I hope the time will come when the State of Massachusetts will spend annually a million and a half of dollars for objects connected with the study of nature, and when we shall not speak of one College of Agriculture in the State, and that endowed with a mere pittance, but when we shall have a temple thrown open, wherever there are a few hundred men gathered together, in which the works of nature shall be studied with the same degree of precision and devotion with which God's Word is studied in our community. That is what we must aim at. That is one of the objects which we have before us, and we must, from this time forward work in that direction. The natural world must be studied, and in order to study it properly, means no less comprehensive than those which are bestowed now on any part of our education should be, *shall be* forthcoming, if I have learned to know anything of the character of the people with whom I have mingled.

Gentlemen, this is a matter of national importance. It is a matter in which the future destiny of the nation is involved; it is a matter in which the relation of this country to the Old World is involved. What is our position now? I speak of "*our* position," because I am glad to say I am now an American citizen. It is this war which has made me an American citizen. I lived here peacefully, not caring for public affairs, during fifteen years, until these troubles broke out. Then I asked myself, What better can I, a simple individual, do, to show my sympathy for the country, and to show my confidence in the present and in the future, than to become an American citizen?

And that I have done. I have done so, ladies and gentlemen, because I believe in the future of this nation; I have done so because I trust that the tables are turning, and that the position in which we stood a few years ago, with reference to Europe, in respect to the higher branches of knowledge, will be entirely changed. Now-a-days, if one of our college graduates, in high standing, wants to obtain a knowledge of those higher branches of science, which are not taught in our schools, what is he to do? If he would become an accomplished chemist, he must go to Liebig, or Wœhler. If he would become an accomplished astronomer, he must go to Besel or Gauss. If he would become an accomplished physiologist, he must go to Bepp or Grimm. If he would become an accomplished naturalist and embryologist, he must go to Paris, and attend the lectures of Cuvier, and so on. That is now the position of America in comparison with Europe. Now, we must change that. We must change it to such an extent, that all our institutions for public education shall be so superior to those of Europe that the European student must come here to finish his scientific education. At least, that is what we must aim at; and that is what we have the means of doing. The time is propitious for that. It is just now that we must strike. It is now, when thinking men are considering what is at stake in our troubles, what may grow out of them, and what is the part we are to play in the progress of humanity. And when they understand that, believe me, the liberal men of Europe, the liberal men of the Old World, will want to send their children here to finish their education, under the influence of these liberal institutions, rather than send them to Oxford or Cambridge, to be snubbed by the nobility.

You have it in your power to do that, but, in order to do it, there is one thing which must be done with reference to the matter of public education. No longer go on boasting as if our public education was the greatest blessing the world has seen, because it is good in its elementary parts. No longer go on boasting as if they were perfect institutions—these institutions which are only superior in the places where they are, because there are no others by their side. No longer go on boasting of our libraries, as if they were doing marvels for education and the progress of learning, because there are a few thousand volumes there. Let us remember what the Old World has done, and continue our efforts in that direction, with unabated energy and devotion, until our institutions have really become superior to to those of the Old World; until they are not only better endowed, but have brought together that number of men who will possess more knowledge and stamp an intellectual character upon them superior to that of the institutions of the Old World. I trust that the character of our free institutions will make it possible for us to accomplish that. I believe it, from what I have seen in these few days, in my intercourse with the farmers of this neighborhood. I never learned anything in my intercourse with the farmers of the Old World. They do not think on what they are doing. They go on in the old routine that has been transmitted to them from a thousand years back. The plough which the old Grecians used is the plough still used in the Ionian Islands. There is hardly anything done in the Old World, in the way of agricultural labor, in which the mind takes part. Here, I see, on the contrary, that what would elsewhere be merely manual labor is intellectual labor combined with handwork, and in this I see the chance of progress.

The first thing to be done is, to endow all these institutions of learning on an entirely different scale from that on which they have been endowed heretofore. This war has taught us one great lesson; and I hope its influence will be extended to everything which is done for public education. It has taught us that great things cannot be done with small means; that a niggardly expenditure will not bring about great results; and if we would have universities that can compete with those time-honored institutions of the Old World, they must be better endowed than they are now; and those who are devoting their lives to public education must be at least as well paid as a clerk in a counting-house. The professors in Cambridge now receive meaner salaries than men who have none of the attainments necessary for those who occupy such positions. Indeed, it is not just to this class of men, to place them in a position in which they cannot live respectably. And yet they do their work, because it is a work of love; and only in so far as that work is done as a work of love can it be in any way successful. You may select your brightest man, and give him as high a salary as you please, and you do not make him a professor in that way. Unless he has made himself a professor before by hard study, he is not fit to occupy the place to which he may be appointed, and the salary of which he may pocket every quarter.

But I have said enough on that subject, and now allow me to turn to my topic,—the origin of the soil in these Northern States. It has been brought down from the high north. It is all of foreign origin. There is hardly any particle of it that has been derived from the disintegration of the rocks on which it lies. There is a difference in this soil from that of most other countries where the soil has been generally derived from the disintegration, decomposition, and comminution of the rocks which form the basis of the country. The origin of that bed of soil which fills the bottoms of the valleys, and which has evidently been brought down by currents of water is a different matter; I speak of that loose soil which covers equally the hills and slopes of the mountains and the rolling country between the river basins. All of that, I say, is of foreign origin, and you will at once perceive how that is connected with those huge masses of loose boulders which are scattered over the country; and when you stand at a place where those large boulders are actually mixed with similar but smaller material, you very soon become satisfied that the cause which transposed those large masses of loose rocks, different from the rock underneath, is also the cause which has transported the mineral material which has accompanied these large boulders, the whole of which is called "drift," and the large boulders "erratic boulders." Now, the cause which has transported these loose materials has produced that drift, which, modified by the plough, by the interference of man, has furnished our agricultural soil; and the question which it is proposed now to consider is, Whence did these materials come, and how were they transported? And in order to explain that, I must go very far out of the way; for, in themselves, these materials hardly furnish us the means of ascertaining how they have been transported.

There is one fact which is unmistakable, and that is, that all these loose materials rest upon the surface of rocks which are generally smooth, polished, grooved, and scratched uniformly; and these marks upon the surface of the rocks, which are immovable, and from the foundation of this drift, trend north and south,—deviating somewhat to the east and west. Evidently, therefore, the movement which transported all these loose materials was from the north, southward. Now, various theories have been found to explain the transportation of these loose materials. Inundations, floods, currents, have been supposed to have swept over the country and to have carried forward in their course all these loose materials. There is one fundamental and radical objection to that theory; and that is, these loose materials are not arranged as water would arrange them. Water, acting in any way that water can act, either as a tide, as currents moving in one direction, or as a freshet, will carry the finer material to a greater distance in the direction in which the current flows, and drop sooner the larger materials. The larger materials will sink first to the bottom, and on top of them, the smaller materials will gradually be accumulated, until the most minute materials form the top of the accumulation. That is what water would produce, and what we find everywhere where its agency is unmistakable. And then, within the mass where water has been active, we find unmistakable drift stratifications,—that is, the materials arranged in layers or beds. If the water was not very active in its flow, then we have regular beds, resting one above the other, in succession. If the materials were carried forward by a current, then we have a dove-tailed set of beds, interlocked with one another, and overlapping one another in various ways, but the eye traces the arrangement in layers or beds. Now, such an arrangement no man has ever seen in our drift. Another thing is characteristic of all the loose materials which are accumulated under the agency of water. Upon these layers, there are other materials besides inorganic masses accumulated. Leaves may be deposited upon them, the carcases of animals which are floated by the water, and all the animals living in the water, will each form such deposits. Wherever we find, for example, gravel and sand and mud deposited on the seashore, we find them full of the remains of shells, crabs, fish. All kinds of living beings that inhabit the sea are found accumulated in those deposits. In our drift, we have no trace of such remains; another evidence that they were not accumulated by the agency of water. And yet, from the want of a proper explanation, it has been supposed that water was the principal agent in transporting these materials. It has been supposed that a great flood, arising from some disturbance in the ocean, swept violently over the whole continent, and that this flood, carrying devastation before it, would, in the end, accumulate these materials, and leave no trace of organized beings in those deposits. That may be; but then, how can the absence of stratification be accounted for, where water is introduced as the agent? for water, acting on loose materials, cannot deposit them otherwise than according to the laws of gravitation; that is, the grosser and heavier materials necessarily fall to the bottom first, and the lighter materials are carried further forward. Now, in the drift, there is no such arrangement. Whoever will examine a bluff of our drift, anywhere in the Northern States, or in the British Provinces, from the coast of the Atlantic to the Rocky Mountains, north of latitude thirty-six, will find that this drift consists of all kinds of loose materials mixed together, without any discrimination of size or weight or nature of the materials, and without a trace of stratification. Such a bank of drift, when examined carefully, will be found to consist of large materials below as well as on top, and such materials in the centre as well as on top and below; and between them, materials of all sizes, from pebbles of the size of your fist, down to smaller pebbles, and finally small sand, and may be, impalpable loam, all of which is mixed pell-mell, with no trace of stratification, to the very summit. And all of these materials will be found not rounded, but having their surfaces more or less polished. They do not present the character of beach shingle; they are not washed clean; they are loamy, and the loam upon them is the sticking loam, which adheres to these boulders,—they are, as it were, cemented together by the intervening loam; while all the sand which is found along-shore is washed clean of all these fine materials. When we find a deposit of clay, we find it by itself, where the water throws ashore only these minute materials; we do not find loam, sand, and pebbles mixed together, as in our drift, in any shore deposit.

If you examine some of these pebbles or these boulders, which have not suffered at the surface from decomposition, you will see that the surface is very polished, shining; it has not the dull appearance of beach shingle; it does not seem to have been rounded, but rubbed and polished; and these polished surfaces exhibit also scratches in various directions, as if at some time these materials had been held fast, as in a vice, while a movable rasp was passed over them, and then, having been turned over, they had received another hard rubbing, which scratched that surface; and, as if all that had been done at the same time that the surface was being polished with minute powder. This is the character of all these materials; and above this mixture of all kinds of materials, you may find the largest and most colossal boulders, and they will be angular, showing no sign of abrasion. Now, conceive, for a moment, water passing over that. You see at once that all these heavy, loose materials will fall to the bottom, and that the lighter material will be carried forward, or, in the end, accumulate on the top of the other. You must find another agent than water, then, to account for the transportation of these loose materials. Now, what can this agent be?

Let me say here, that it is these accumulations of loose materials that constitute, all over the Northern States, the soil. It is this material, more or less altered by vegetation, it is this material, ploughed and worked by man, which has become the basis of our agricultural pursuits. It is that material, the origin of which we must now try to explain; and it is the arrangement of that material which we must seek to understand fully, in order to appreciate why there is more gravel or more quartz in one region than another; why the soil is poorer in one tract of country than another. You will see, in the end, that these differences arise from the manner in which these materials have been brought down from more northern regions. Now, let me state, further, that always, wherever the underlying rock has not sustained extensive alterations by exposure to atmospheric agencies, the surface is polished, and it is so polished that it shines like a marble mantel-piece which has been worked to the height of polish that it can receive; and upon that polished surface is engraved a system of lines which are always straight, and always running north and south, deviating somewhat to the west; and not only scratches and thin lines, but grooves and furrows, sometimes very extensive and broad, which have worked quite deeply into the solid rock. This is the basis on which these loose materials rest, and there can be, at first sight, little doubt that the cause which transported these loose materials is also the cause which has polished, scratched, grooved and furrowed the underlying rock; that these phenomena go together, and that the same cause has at the same time transported those huge boulders which rest on the whole, and which are still uncovered. Your cause must, therefore, work in a very strange manner. It must touch the bottom, and be powerful enough to abrade it, to polish it, and, while polishing it, to groove and scratch it. It must, at the same time, be able to turn this curious mixture of loose materials over, to be polished and scratched, on the other side; and it must be of such a character that at the same time it carries forward, on the very summit, and nowhere else, huge angular materials. Now, such a cause is not known to act anywhere in the regions where drift is found now. The drift is the result of the action of a cause which has passed by, at least, within the limits within which it is observed; and the question arises whether we have anywhere a cause, which, in our day, produces that combination of phenomena, so that no link shall be wanting; and, if that be found, whether it is possible that, at some time or other, that known cause should have acted on a larger scale, and have been productive of those same effects in regions where it is no longer known.

Now, I believe that such a cause exists. I believe it may be seen doing these very things to-day. I believe that that cause, which is now limited within a very small area, was once much more extensive, and, in fact, worked wherever we find drift; and that cause, in my estimation, is the glaciers which are found only in the high mountains of Central Europe, in the high mountains of this hemisphere, within certain limits in the Arctic regions, and in the Antartic regions; and it is to an attempt to prove to you that there were once fields of ice covering the whole of this blessed country, extending not only over the colder and more temperate part of the Northern States, but at least to latitude thirty-six, it is to an attempt to prove that such a state of things has existed here, that I will devote the remainder of my time this evening.

Now, what is a glacier? I wish I could open to you the scene as we have it in the region where glaciers exist now. It would go very far to elucidate the subject which I propose to consider; or, at any rate, give you some idea of the colossal dimensions which glaciers exhibit even now, though they are reduced to such an extraordinary extent from what they were in former times. A glacier is not frozen water, resulting from the congealing of the Alpine streams, but it is the result of the slow and gradual transformation into ice of that snow which falls every winter in high mountains. That process of transforming snow into ice, we may witness every winter in our streets. When, after a snow fall, the temperature rises a little above thirty-two degrees, the snow becomes moist, and, in consequence of this partial melting, it is very soon transformed into a mass of ice grains, which are loosely cohered, or entirely incoherent. Let a frost come, and these grains are frozen together, and the whole mass becomes one pudding-stone of ice, if I may express myself so. It is a mass of ice, not consisting of layers, as results from the freezing of water in successive sheets, but it is a mass of ice resulting from the congealing of the grains of ice which have been formed by the partially thawing snow. Now, a mass of ice formed in this way is constantly changing its relations to its parts; and upon a slope, in consequence of this change of parts, it is moving, and it is moving at a rate which is quite considerable. I will take the facts as they are in the Alps, where you may see along the slopes of the Alpine valleys, the onward movement of such masses of ice, resulting from the transformation of the snow in the higher regions into ice. That motion may be two or three hundred feet a year; it may be less or more, according to circumstances; but there are conditions which determine the rate of this movement.

Now let us consider one particular case, so that we may have these facts very clearly before us. There are in Switzerland three chains of mountains, about the same distance apart—the Finster-Aarhorn, the Schreckhorner, and the Wetterhorner. Upon the slopes of each of these mountains, there is a large accumulation of snow. Suppose, at one point, we have nine thousand feet above the level of the sea. Above this level, all these masses of snow retain, more or less, their character of snow. The level is too high for frequent thawings to take place; too high for rains to fall, or for the moisture in the atmosphere to fall, in any form except snow. I have, at that elevation, witnessed a fall of snow, in the early part of August, which left, as the result of one night's fall, two feet on the ground. You see, therefore, that when it rains in the lower regions, we have snow in these higher regions, and that snow has not so frequent chances to pass into ice as it has lower down, where the temperature being higher, there are more frequent oscillations above and below thirty-two degrees. At this point, the temperature is very constantly below thirty-two degrees. Lower down, about the level of six or seven thousand feet, there are frequent alternations above and below thirty-two degrees. Further down still, say at five thousand feet, the temperature is, during summer, always above thirty-two degrees, and only during winter below thirty-two degrees; so that we have the most diversified climatic conditions in a distance which is small, but which is made great, practically, by the difference in height. We have there, without travelling more than an hour or so, differences which amount to the difference you observe when, starting from here, you go to

Greenland. You pass from a New England to a Greenland climate, in these mountains, in an hour's walk—owing merely to the difference in height. Now, this is the condition under which the snows which accumulate in the higher regions may, passing down to a lower level, be transformed into ice; and the motion of this whole mass will vary according to the amount of moisture which results from the partial thawing, and to the progressing of the freezing and the moisture. Now, without entering into details, let me at once put down some of the results. At the height where the process of thawing is very slow, the motion in a year may be ten or twenty feet. Lower down, at an elevation say of nine thousand feet, it may be forty or fifty feet. At seven or eight thousand feet, it may be as much as one hundred and fifty or two hundred feet. Where the level is about six thousand feet, we have a movement which may be two hundred and fifty or three hundred feet a year. Now comes a singular change. Further down, the motion becomes less and less. And why? The ice is compact. It is so compact that there is no thawing within, but there is melting on the surface. There is a slight moisture penetrating into this mass, and in consequence of this, a little expansion, so that in proportion as the ice begins to be so compact that it can no longer receive water in its interior, and expand by the freezing of the water, the motion is reduced; so much reduced, that at the lower end, the movement may be only sixty or seventy feet a year. When it started at the snow fields in the higher regions, it had an initial movement of ten or twenty feet; it increased to two or three hundred feet, and was finally reduced to a movement of seventy feet, on slopes which are the same, or which do not present any great difference in steepness—showing distinctly that this motion is not determined by the slope, but by meteorological influences; that is, by climatic influences,—by the amount of moisture, and by the frequency of thawing and freezing.

Now, these differences of climate you may have, on a level, in different latitudes; and a glacier, or mass of ice, or sheet of ice, may move on a level quite as much as down hill, if on one side of the mass there is frequent thawing and freezing, and on the other side only a continued accumulation of snow; and I have satisfied myself, by a process which would be too long to explain, that the northern ice-fields move southward, not because they are resting on a surface inclining from the north southward, but owing to the fact that it is colder further north than further south. Further north there is more snow accumulating, further south there is more ice forming, in consequence of the frequent thawing and freezing, and these alternations of thawing and freezing. That is, from the north southwards, we have all the conditions which we have very high up and down in an Alpine valley. There is one fact to show us that this is unquestionably so. Every year the Atlantic is covered by icebergs. Now, these icebergs are not frozen sea-water; they are masses of arctic land ice, which advance to the ocean by their own periodical movement, and which, when pushed over into the ocean, having no further support, break off from the land ice, and are floated south. That is the origin of icebergs. The fact has been observed by all Arctic travellers. It has been satisfactorily observed off Spitzbergen by a friend of mine, who knew the glaciers before going there, and who saw these glacier icebergs break off from the land ice, which had its own movement, similar to the movement of the glaciers of the Alps.

Now, what is such a mass of ice doing in the way of mechanical work, while it moves in that manner? What is the mechanical work done annually by the glaciers of the Alps in their descent from the higher mountains to the lower valleys in which they terminate. Mount Blanc, fifteen thousand feet high, is on all sides covered at the summit with snow; further down, with glaciers which terminate in the valley of Chamouni. In the valleys on the southern side, we find glaciers, the lower ends of which are only three thousand feet above the level of the sea. They are masses of ice which have come down eleven or twelve thousand feet, from the summit of the mountain down to the valley. You find the glacier of the Grindelwald, and all the other glaciers of Switzerland, commencing at heights varying from twelve to fifteen thousand feet, and terminating in the valley, at heights of five, four, or three thousand feet above the level of the sea.

Now, these glaciers, when they come down, are all the time rubbing over the surface of the rocks, and rubbing, bruising, crushing, polishing, and grinding, in a very efficient manner, owing to another series of facts, to which I will now call your attention. I have measured the depth and thickness of the mass of ice in the chain of mountains to which I have referred. I have been under it; I have been in it; I have seen it in every possible way; I have let myself down into the crevasses to the depth of several hundred feet; I have walked up the streams which flow out from below, so that I can speak from personal observation of the character of the facts to which I am now alluding. In some parts, this mass of ice is about a thousand feet thick; in some parts, it is three or four miles wide; at its lower end, it is about one mile wide, and the length is about seventeen miles. This, however, is not one of the great glaciers. It is a dwarf in comparison with some of the Arctic glaciers observed by Dr. Kane. The Humboldt glacier is one hundred times larger than that. And yet you have here a surface of ice seventeen miles in length, with an average width of over two miles, an average thickness of many hundred feet, and at least a thousand feet high. You will conceive, therefore, that this mass of ice, moving down that valley, will produce some mechanical effect; and it will be evident that it will produce the more mechanical effect, when you consider that there are constantly particles of rock disengaged from the sides of the valley and falling upon the surface of the ice and penetrating under the ice, and finally down to the rock over which the ice moves, so that the under surface of the ice, which rests upon the rock, is in the end changed into a rasp,—studded all over with pebbles of all sizes, which are immovably set in the ice. When under the glacier, I have seen fragments of rock one, two, and three feet thick, set in the ice, immovably, and pebbles, of the size of your fist down to small grains of sand, all set in the ice. These fragments would form, then, a part of the under surface of the glacier. Now, the whole mass moves forward, and conceive what a rasp it is! Passing over rocks of the greatest hardness, there will be, among these fragments of rock set in the ice, some fragment or other which will be at least as hard, if not harder than the rocks over which it moves, and the result is, that in the end the whole surface of the rock is abraded to an extraordinary extent, and while the minor particles polish these surfaces which are abraded by the larger materials, the larger materials make scratches, grooves, and furrows. You have here, then, a combination of circumstances which explains the simultaneous formation of polished surfaces, grooved, scratched, and furrowed, and the formation, over these surfaces, of materials which have pressed against one another, occasionally turning in their sockets, changing their surfaces of abrasion, and thus becoming polished, grooved, and scratched; but the materials are so set that they do not change their positions in a way to bring the heavier to the bottom and the lighter above, or to impart to them anything like a regular stratification.

This is what is going on underneath a glacier; and I can add that I have seen the bottom of a number of glaciers, and I have found there a kind of paste (made up of loam and sand,) coarser and finer gravel, pebbles of all sizes, and boulders of all sizes, rolled up together, and mingled in a confused way. Occasionally, a large mass of rock, will separate from the soil of the mountain, fall on the ice, and remain on its surface, and as the glacier moves, that boulder is carried along, remaining on the surface of the ice, and undergoing no abrasion; rubbing against nothing, but being carried smoothly along, while all this grinding is going on underneath. Now, suppose for a moment that the glacier melts away, what will be the consequence? This accumulation of loose materials, put together pell-mell, remain where they are, and these large angular masses, which have been carried on top of them, rest on these loose materials, but do not sink to the bottom with them. We have, then, such an accumulation of loose materials as we actually observe in the drift; the mass of the drift being a conglomerate of all kinds of materials, mixed indiscriminately together, and on top of them rest these large angular boulders.

This, in itself, would be sufficient to satisfy a skeptic that there is some foundation for considering glaciers as the possible cause of the transportation of materials like drift, but I should like to carry the comparison a little further, and to show you a little more fully that there can be no other cause so active as this, and that we have, in the fields of ice of our northern latitudes the true cause of the transportation of our drift, and of the grinding by which it has been brought into its present condition.

When these loose materials which fall on the surface of the glacier are, with its movement, brought down to its lower end, they accumulate at the point of its termination, and form at its lower end a hill across the valley, in which the glacier terminates. Now, these circumscribed hills of loose materials mark the boundary of the glacier, and within that boundary the whole surface of the rock underneath presents the character I have described. But let us examine a little the sides of the valley, above the present level of the glacier. We find that they are polished like the rock underneath. They are polished in the same way, and scratched and ground in the same way, as if the glacier had had, at one time a higher level; and beyond its present termination, in the same valley, I find there are such concentric hills of loose materials. They are not arranged as a river would arrange them. A river deposits such materials in the centre of its course, but these are all arranged in concentric moraines, across these valleys. Now, take this glacier of which I have spoken, at the head of the valley of the Alps, terminating near the Grimsel, where the hospice stands, which is the stopping-place for travellers from the Bernese Oberland into Italy. Now, the distance from the origin of this glacier in the Alps to the chain of the Jura, is over a hundred miles, following the sinuosities of the valley, and all over this tract, we find these concentric moraines. That is, this glacier must once have extended over eighty miles beyond the limits which it occupies now. No doubt it once reached the Jura, for boulders identical in character with those which we see dropped from the summit of the Schreckhorner,—talc slate boulders, which are unmistakable, and cannot be confounded with any other rocks along the whole of this track,—will be found three thousand feet above the level of the plain, on the crest of the Jura. It would seem, then, as if the ice had once occupied all that space. Let us look at the valley of the Aar. When you go from the higher part of the plains of Switzerland into the Alps, you have a deep cut, and there the level of the valley is about two thousand eight hundred feet above the sea. On the sides of this valley, you have these polished surfaces, to a height of nine thousand feet. That gives you the thickness of the ice there at about six thousand feet, when the glacier, which we now know to be about one thousand feet thick, extended forty odd miles further on, and it was over three thousand feet thick where it reached the Jura.

These were the facts which I had observed. Well, it occurred to me that it was impossible that these facts should have been brought about without a change in the climate of the earth; without an extraordinary change in the condition of the temperature of Europe, at least; and I set out to ascertain, within these limits, the changes which took place. These evidences of the gradual extension of the glaciers had only been traced within the borders of Switzerland. Now was the time, I thought, to ascertain whether any evidence of glaciers existed beyond those borders. I at once went to England to seek for the marks of ancient glaciers. When I arrived there, in 1840, every geologist laughed at me, said I was on a wild-goose chase, and discountenanced my pursuit as a chimerical one. One geologist, however, who had confidence in my methods of observation and appreciated my purpose, Dr. Buckland, said he would accompany me to Scotland, where he was better acquainted than I, as a foreigner, was, and we went on together; and there, in the first valley to which we penetrated, we found, according to the prediction I had made from looking at the Alps, moraines across the valley, the sides of the valley polished, and every sign of the former presence of glaciers, as within the Alps now. Thus appeared the evidence that the change of climate had not only occurred in Central Europe, but that there had been a general change of temperature throughout Europe. Soon after that, I came to this country, and as soon as I arrived at Halifax, I ran away from the steamer to a hill near by, and there I saw the same marks of the existence of glaciers,—these smooth surfaces, these grooves and these furrows on the rock, and that peculiar drift, with all its marks; so that I became convinced that the same changes must have taken place here, and that all this drift must have been accumulated where it is by an agency similar to that which now-a-days produces similar accumulations, which I have no doubt to be the glaciers.

In a full presentation of this subject, I shall attempt to remove the slight objections that arise against this or that interpretation of the phenomena. I believe I could do it easily, but time will not allow me to enter into these details. I might attempt to say something concerning the causes of these great geological changes and changes of temperature; and I might, perhaps, be able to reconcile the view I have presented with the fact, in which I have full confidence, that our earth was once warmer than now, though I say, too, that it must once have been much colder than now. I think I could explain, in a measure, the cause of these great oscillations. I would have only to recal to your mind the fact that in the Arctic drift we find buried elephants, rhinoceroses, and other animals only found in the tropics, to give you the full evidence that the climate of the earth was once warmer than now. I ought now to add, that these carcases are found covered with flesh, and that they are so well preserved that dogs and wolves have eaten their flesh, to show that the changes which took place were not such as to produce decomposition of these animals, (and we all know what a good preserver of meats ice is,) and in that way I think I could satisfy you, that chimerical as this theory may appear, it is founded upon a series of well connected facts, which leave no other alternative than the conclusion that this Northern Hemisphere has been once covered with a sheet of ice, extending from the Arctic regions to the limits where we find connected drift, to latitude thirty-six; and that it is to the mechanical action of that sheet of ice we must attribute the source of our soil.

You see, ladies and gentlemen, that in considering this subject, I have had to resort to a different explanation from that which was given yesterday in relation to the formation of the soil in more southern latitudes. I believe we are both right, although we have to attribute to so entirely different agencies the production of one and the same phenomenon.

Mr. PERKINS.—*Mr. Chairman,* I feel that this State Board of Agriculture have been pleasantly together here, and that much of the pleasure of these interviews has been due to the fact that we have had the use of this hall for our meetings. I move that the State Board of Agriculture tender to the authorities of this town their sincere thanks for their liberal bestowal of the use of this hall for our meetings.

This motion passed, unanimously, and the Board adjourned, *sine die.*

ANNUAL MEETING AT BOSTON.

The Board met in accordance with adjournment, at the office of the Secretary, in Boston. Present, Messrs. Agassiz, Adams, Bull, Clement, Garfield, Grout, Hartwell, Homer, Huntington, Johnson, Keith, Lathrop, Loring, Moore, Perkins, Phinney, Saltonstall, Sewall, Smith, Stockbridge, Taft, Thompson and Tidd.

In the absence of his Excellency, the Chairman, Mr. Lathrop was requested to preside, and accordingly took the chair.

The first day was occupied in the reception of the reports of delegates appointed to attend and report upon the exhibitions of the County Agricultural Societies.

These reports will be found on a subsequent page.

On Friday the 27th, the attendance being the same as on the first day, with the addition of Mr. Stedman, Mr. Bull, of Concord, was requested to preside, and accordingly took the chair.

The reports of committees on special subjects being in order, the first presented was the following:

ON GARDEN VEGETABLES AND ROOT CROPS.

BY MR. T. G. HUNTINGTON.

The Committee chosen to report on root crops and garden vegetables, on looking over the field assigned them, soon became convinced that a proper treatment of these subjects would require a larger space than is usually devoted to these reports, besides involving an amount of time and research incompatible with other engagements. They have ventured, therefore, to drop altogether the matter of root crops; and they were the more ready to do this on recollecting that an elaborate report was presented to the Board but a few years since on this subject.

Although the conclusions arrived at in this report are such as your committee hardly feel ready to accept, yet as far as the argument is concerned, it must be admitted that the author has good ground for his opinions.

The economy of root-raising is, to some extent, still a mooted question, and your Committee have no *facts*, or rather not enough of them to throw into either scale to cause a preponderance in favor of, or against their cultivation. Probably if it is ever settled, it will be found that location, the cost of land and labor, with the comparative facility of raising the cereals, corn, and other forage crops, will have much to do with its decision.

Leaving out then root crops, and taking only garden vegetables, our subject is still a most comprehensive and important one. It concerns every man who has a rood of land, and has more to do with the health, comfort and thrift of our homes, than most people are willing to admit. Although no advocates of an exclusively vegetable diet, we firmly believe that a well-kept garden, furnishing a good variety and succession of fruits and vegetables through the season, will be found to lessen materially the expenses of the family, to secure its more uniform and better health, as well as to lubricate the machinery of its life generally. We may form some idea of their importance in our social and political economy by a reference to some statistics of Massachusetts in connection with one or two of the other States. It appears from these that until 1860, or near that time, there was but one State in the Union that exceeded Massachusetts in the value of the produce of her market gardens, and that was New York. She now stands only the third State, New Jersey being the second, and exceeding her by some two hundred thousand dollars.

The population of Massachusetts in 1850 was 994,514 ; in 1860 it was 1,231,066. The rate of increase from 1850 to 1860 was 23.79 per cent.

The increase in the production of her market gardens is as follows:

In 1840 it was	$283,904 00
In 1850 "	600,020 00
In 1860 "	1,397,623 00

More than doubling every ten years. The increase in the State of New York was in about the same ratio. So it appears that while our population increased for the last twenty years at the rate of less than twenty-five per cent. in ten years, the production of our market gardens has increased one hundred per cent. in the same time.

But the growing value of this interest will better be seen if we compare it with some of our other productions. Massachusetts produced in 1860:

Of Butter,	8,297,936	lbs.,	which,	at	16⅔ cts., =	$1,382,986 00
Of Potatoes,	3,202,517	bush.	“	“	33½ cts., =	1,067,506 00
Of Corn,	2,157,063	“	“	“	75 cts., =	1,617,795 00

It will be seen, therefore, that taking the three important staples of butter, potatoes and Indian corn, the yearly produce of our market gardens exceeds that of the two first named, while it very nearly equals that of the latter.

But this is not all. The corn crop, while it increased from 1840 to 1850, has, since that time, decreased. The potato crop has steadily decreased since 1840, while the increase in the production of butter for the last ten years has been but slight, and this while the production of our market gardens has increased almost fivefold. Indeed it is probable, that at the present time, there is but one single agricultural production in the State that exceeds it in value, and that is the grass or hay crop. These figures are instructive. They show us what direction our industry is to take as the resources of the State become further developed. While the production of grass and hay will always claim a prominent, perhaps the chief place in our regard, the produce of our gardens and orchards bid fair soon to outstrip all others in importance. We are led to this opinion, not only by the figures we have *adduced*, but in looking over the statistical tables we find the *growing* interests in this direction, viz., fruit-raising, wine-making, sugar-making, &c.

It becomes the intelligent farmer, then, to watch this tendency, and while he is careful not to run rashly into new experiments, still to be ready to avail himself of any opening in this direction; even if he should anticipate, to some extent, the public want, he can hardly be a loser in the end.

Having said thus much on the importance of vegetable productions, a few general remarks on the requisites for successful cultivation, may not be out of place.

One of the first of these is a proper soil. This is what is called a warm or quick soil. It is true that there are certain vegetables which grow well in that of an opposite character, but for a market garden, or even for one merely for the family, there is hardly anything that will compensate for this. We say, then, that when the usual variety of vegetables are cultivated, if the soil is not naturally of this character, in order to secure the best results, its defects should be remedied, as far as possible, by artificial means. These will, of course, be draining, and if the soil is stiff and retentive, a mixture of sand, lime, &c., to break it down and render it friable.

The next point is abundant manuring. For this purpose, probably nothing is better than well rotted barnyard manure. Green manure, as it is called, produces good results in some cases; but the general effect of it is to give a coarse plant with a disagreeable flavor. In lands recently devoted to garden purposes, manuring should be abundant. The object should be to create a large supply of rich mould, for it is in this that vegetables luxuriate. In order to increase this, well rotted turf is excellent, or the deposits of leaves in the woods. If these last are taken and used abundantly as bedding for stock, and then composted with the droppings, they make one of the best dressings for garden or vegetable culture. In connection with barnyard manure, there are special fertilizers suited to various crops, which may be used to good advantage. Guano is excellent, in many cases, especially when used with plaster, though it requires care in using. The latter is good alone for leguminous crops, such as peas, beans, &c. But, perhaps, there is no single article suited to a greater variety of crops than pure bone superphosphate, that is, ground bones dissolved in sulphuric acid. The writer knows of striking results from the use of this article, both in garden and field crops.

We pass on to a third requisite in successful gardening, viz., cultivation. This, though the last, is by no means the least point to be considered. In fact, it is just here that success or failure most often hinges. Any tyro in vegetable culture may select a suitable spot of land for his purpose, or, by the proper means, he can make it nearly what he would have it. He can supply manure in the greatest variety and abundance, and of the best quality. He may even so manipulate with these two, as to put them into the best possible condition for the reception of the seed, and yet, if his proceedings thereafter are at fault, partial, or even total failure may be the result. Sometimes a single misstep may destroy the hopes of a season. It is here that experience is an invaluable guide. She observes and treasures up a thousand trifles which are not thought worthy of a place in books, and yet, trifles as they seem, they often contain within themselves the secret of success or failure. In many instances the choice of a variety, the selection of seed, the manner or the time of planting, are things of the first importance. We have known beans to be so planted as never to come up, or to have expended so much of vital energy in the process as to accomplish nothing afterward. So, too, a slight difference in the planting of corn has, in the end, made the difference between a fair crop and almost total failure. It is so through the whole round of vegetable culture; while there is much to be learned from books, there is nothing like personal contact with nature, to wrest from her the secret laws of vegetable life, so that she may be aided in converting the unpromising seed into so many and useful forms to meet the wants of man.

Having said thus much upon the subject of vegetable culture in general, and called attention to its growing importance, we propose in what we have further to say, to take up two or three of the more prominent articles, and treat them somewhat in detail, deeming such a course more useful than an attempt to go over the whole ground of garden culture in our prescribed limits. We have selected for this purpose onions, cabbages and winter squashes.

ONIONS.

The importance of the onion will be conceded by all. It not only enters largely into our home consumption, but is becoming an article of export. In the year 1853, the value of this crop exported was over two hundred thousand dollars,—a little more than the value of apples exported the same year. It is both wholesome and nutritious, and is especially valuable as an antidote to those diseases incurred by a too exclusive diet of salt meats, &c., such as is used in the army and at sea. As an instance of the increasing demand for this esculent, it may be stated that one of our inland towns has lately commenced its cultivation, and though there is no large market in the vicinity, and the ground devoted to it is becoming extended every year, it has never been a drug, but, on the contrary, the price has been continually rising.

Dr. F. Unger, in his sketch of the plants used as food by man, published in the Patent Office Report of 1859, says that, "the onion is probably indigenous from Palestine to India, whence it extended to China, Japan, Europe and North Africa. It was highly prized by the ancient Greeks, the Jews, and the Egyptians. The island Cimolus was endowed with the surname of Onion, because onions of remarkable excellence were cultivated upon it." Unfortunately we have no means of knowing what was the method of cultivation then, or whether it was to this or some peculiarity of soil or climate that their superiority was owing. Consequently in treating of its cultivation we shall have to confine ourselves to the best practice of more recent times. The first question that presents itself is, what is the most desirable soil? To this it may be replied that they admit of considerable range in this respect. We have seen them growing well, both as regards quantity and quality, the past season, on a great variety of soils; on newly cleared, light, plain lands; on the alluvial bottoms of the Connecticut River, on rather cold, clayey loam, and on old gardens. This in Hampshire County, where their culture has recently been introduced, and where the crop compares favorably with its old home in Essex County.

Writers on the subject, who are good authority, say that the soil best suited to it is a dark sand, or one rather inclining to sand than clay. Manure should be applied in great abundance, as there seems to be little danger of over-feeding the crop, and it is a point of great importance to give the plants a vigorous start, as well to secure a healthy growth as to prevent the attacks of the maggot. As a main dependence there is nothing better than manure from the barnyard or hogpen, and if well decomposed or composted, so much the better. In some parts of Essex County, where comparatively little barnyard manure is made, a compost of peat, seaweed, and night soil is used with great success. As special fertilizers, fish guano, superphosphate, and ashes are excellent,—the two latter to be applied to the drills after sowing.

Having soil and manure, the next important thing is good seed. If the cultivator fails here his failure is likely to be irretrievable. Seed that "won't come" is acknowledged by all to be a nuisance, but it is not so generally known, that seed which will only just come is but little better. Indeed, the practical effect is sometimes worse in the latter case than in the former. A few straggling plants, coming up irregularly, like laggard and undisciplined soldiers endeavoring to form a line, is apt to beget a hope, which, however, almost always proves illusory, that the ground will finally become stocked. So between hoping and waiting, the opportunity is lost for replanting. The standing plants show but a puny growth. Their unpromising appearance leads to neglect in cultivation; weeds take possession of the ground, causing a more diminutive product, and so the whole operation ends in disappointment and perhaps loss. Let all care, then, be taken to get seed that is uniformly plump and sound, such as will not exhaust itself in pushing its germ into sunlight, but waits only the proper conditions to start up into a vigorous and unimpeded growth.

A marked illustration of the importance of good seed, came within the experience of the writer the past season.

A plot of ground was prepared, all of it in precisely the same way. In sowing, the seed fell short by some half dozen rows. It being inconvenient to get more of the same seed, the want was supplied from another source, and the sowing finished. In due time the plants on the part first sown, came up with a fine, healthy look, which they kept through the season, making a crop fair in quantity and most excellent in quality, with very few of scullions, although it was the first time the ground had been used for this crop. The appearance of the other part of the plot was in marked contrast to this through the season. But a small portion of the seed came up; the germination was slow and feeble, the plants through the season seeming to lack vitality. The bulbs were coarse in texture, and the scullions in much larger proportion than the others, making in all not more than half a crop.*

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* To save seed, select the best bulbs; set them out in April, in rows two and a half feet apart, and one foot apart in the rows. As the plants grow, tie them up to stakes. The seeds ripen in August, when the heads assume a brown color. They should be cut off, thoroughly dried and threshed, when they can be put away for use.

The varieties most cultivated for winter use are the red and yellow. Of these, the red is considered by some as more hardy and prolific. It is undoubtedly the coarser and more pungent of the two. The yellow stands first in point of quality, and according to Burr, on account of its keeping qualities, is better adapted to shipping purposes than some other kinds. The Danvers, which is but a sub-variety of the yellow, and equals that in point of quality, possesses, from its peculiar shape, an advantage over it in cultivation. Owing to this shape, which is globular, or approaching to that, a greater number of bushels will stand on an acre than of the flat kind, a point of some importance in the cultivation of so expensive a crop as this.

While on the subject of varieties, it may be as well to say, that the top and potato onions being raised chiefly for summer use, we pass by, confining ourselves to what is of more general interest. We come then to the matter of cultivation, and here three things are of great importance, viz.: careful preparation of the ground, early sowing, and thorough cultivation through the season.

If the land is naturally inclined to be cold and wet, its preparation may be much facilitated by being thrown up into ridges, in the autumn, subjecting it to the action of frost through the winter. By this means it is not only the sooner made dry in the spring, but the mechanical division of the soil is much assisted. The most simple way of doing this, is merely to make the furrows of double width, in reality turning over but about half the ground, and throwing the ploughed portion upon the top of the baulk or unploughed part. It is a good practice when this operation is performing, to apply the manure at this time, covering it in the way mentioned above.

As soon as the ground is ready to work in the spring, the furrows may be harrowed down and the land cross-ploughed, which brings it into fine tilth. When the fall ploughing is not done, the cultivator can pursue any course which he deems best, provided he secures the end to be sought, which is a firm, light, smooth bed for the seed. Great pains should be taken in this matter, as not only the thrift of the plants but their economical cultivation depends very much upon it. As the finishing stroke to this process nothing is better than the hand-rake, as it smooths inequalities, takes out all rubbish, and prepares the ground nicely for the drill.

In regard to the time of sowing, something depends on the selection of a suitable piece of land, one that affords early working, being much the most desirable, as it seems almost impossible to sow too early, and not only so, but it is one of the essentials to success. So much importance is attached to this as to lead in some cases to the sowing of ashes on the snow to hasten its thawing, that the ground may be earlier fitted. Probably, however, any time in April will not be too late.

Since the introduction of onion culture to the neighborhood of the Connecticut River, a hand-cultivator has been invented by Levi P. Warner, of Sunderland, which is much prized as a labor-saving instrument. This is convertible into a sower, in which capacity it works with great precision, and is very nearly a perfect machine. The amount of seed sown is about six pounds of the red and five of the yellow or Danvers, and with this amount it is not considered necessary to thin out.

As soon as the plants are large enough to fairly show the rows, the ground should be run over with the cultivator or hoe, and within a week or ten days after, the first hand-weeding should be performed. It is impossible, however, to lay down rules here, unless it is the single one, never to let the weeds get the advantage. Small weeds are more easily killed, and with less injury to the growing crop than large ones, and besides a clean field will almost pay for the pleasure it affords the eye. The labor of weeding may be performed by children after a little practice. We found during the last season, which, owing to the drought, was not favorable to the growth of weeds, the ground needed cleaning about once a fortnight. There is one weed (purslane,) which seems to thrive under any amount of hoeing, and when the ground is badly infested with it, it is better to devote it to some other purpose. After the crop is matured, which is indicated by the falling over of the tops, the onions may be raked or hoed out of the ground and left to cure for a week or two, when they should be topped and removed to some dry place under cover, where they can remain as long as there is no danger from frost, or until they are sent to market. The onion is strongly inclined to grow after being gathered, and the condition of success in keeping it is said to be a low, dry temperature, but without frost.

The cost of raising varies in different localities. The price of manures, of labor, and the character of the land, both as regards foulness and natural fertility, are things that will affect very much any estimate we may make. Our own experiments in a small way the past season, show a footing up of some two hundred dollars per acre, besides rent of land. This, owing to enhanced prices, is about double what it was four years ago. Of this sum about one hundred, or at that rate, was paid for seed and fertilizers. This is probably more than usual. One of the largest growers in this region, estimates the average expense this year, *including* manures and rent of land, at two hundred dollars. The produce varies still more than the expense, ranging from complete failure, up to eight or ten hundred bushels to the acre, according to the skill of the cultivator and the freedom of the crop from its usual casualties.

It is well known that its most formidable enemy is the maggot. So serious have become its depredations that in some regions where the onion was once the staple crop, its cultivation has been nearly abandoned. No prevention has been found, but the best chance for avoiding the evil seems to lie in taking up new lands. The objection to this is that the first crop is likely to be imperfect, having a large proportion of scullions.

We would suggest as a remedy for this, and as enhancing the chances of success, a thorough rolling of the ground both before and after sowing, and if the last can be done by a hand roller, so much the better, as the feet of teams are very apt to press in a part of the seed too deeply, causing it to come up unequally, and impeding cultivation.

We have thus endeavored, in as few words as possible, to point out the best methods in the cultivation of this important esculent. At present prices, it is certainly equal to the tobacco crop in point of profit, and certainly exceeds it in that of utility. We have almost a guarantee that it shall not become a drug, in the fact, that as a winter vegetable it cannot be raised in southern latitudes; consequently it becomes an article of export, and takes its place as one of our staple productions.

CABBAGE.

Under the head of Brassicaceous plants, Burr, in his Field and Garden Vegetables of America, enumerates Kale, Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Colewort, Portugal Cabbage, Chinese Cabbage, Savoy, and Sea-Kale.

These are divided into numerous varieties, each possessing the same general characteristics, and yet distinguished for their habit of growth, their appearance, their flavor, or some other quality peculiar to themselves. Of these we have selected the cabbage as not only the most important of the brassica tribe, but as next to the potato, perhaps, the most largely used of any vegetable esculent in Massachusetts, or even in New England. Especially has this been the case since the introduction in so large proportion of the foreign element to our population. Among the Irish, the Germans, and the French, at least the Canadian French, in its season, and in one form or another, it forms a staple article of consumption. And there is good reason for this, since the cabbage is one of the most nutritious vegetables grown, containing, according to Johnston, when deprived of its water, about thirty-five per cent. of tissue-forming compounds, such as albumen, &c., and forty-six per cent. of starch and sugar, while the potato contains only nine per cent. of the former, though it is richer in starch than the cabbage.

It is a curious fact, affording a good illustration of that instinct by which man, in his natural and simple state, lays hold of those productions the nearest allied to his wants which his circumstances will allow, in that, being unable to procure in their native country a free supply of meats, these hard-working people should have substituted for it two vegetables the best calculated to supply the waste of muscle tissue, occasioned by their daily toil.

We have no means of ascertaining its comparative value among the productions of the State, or the part that it plays in the support of its population; but if there were any statistics, as there should be, by which these points could be proved, probably its importance would be a matter for surprise to the superficial observer. Its great use for culinary purposes, however, is not confined to New England, or to this country even. Dr. Unger, whom I have already quoted, says: "No kitchen-garden in Europe is without it, and it is distributed over the greater part of Asia, and, in fact, of the entire world. The original plant, undoubtedly, occurs wild at the present day on the chalk rocks of the sea province of England, and on the coast of Denmark, and North-Western France; and it is a question whether this marine plant did not at one time have a much wider distribution when the climatic peculiarities of Europe were different from what they are now." He says further on, "It is very remarkable that the European and Asiatic names used for different species of the cabbage, may all be referred to four roots—to the Celto-Sclavonic root, Cap, which means head; *Brassica* of Pliny, is derived from the Celtic, Bresic, (cabbage.)

"The Celto-Germanico-Greek root Caul, whence Kale, &c. Finally, the Greco-Germanic root Cramb, which passes into into Krumb of the Arabian, and probably into the German Kraut, which originally indicated the cabbage plant, but subsequently became a generic name." These facts are interesting, chiefly as showing the wider distribution and use of the plant, and are rather curious than useful.

But its value is not limited to the various culinary purposes to which it is so well adapted. As a forage crop it is hardly less important. Wherever a system of soiling is pursued it should come in for a supply of the stock, or, at least, a principal share for at least two or three months in the year. Coming, as it does, immediately after the autumn frosts, when green corn is no longer to be had, it offers the very best supply of green feed until the first of December, and, by a little care, even to the middle of that month or the first of January. And, although it may not be practised to its full extent, it is well worth while for every farmer to have his half acre or acre of cabbages, to keep up the flow of milk when the pastures begin to fail. We speak from abundant experience in this matter. This very season, a cow that had been running in a pasture and making but about four pounds of butter per week, was taken into the stable and fed with forty pounds of cabbage a day, with what hay she wanted, which was but little. Her flow of milk immediately increased so that it produced six or seven pounds a week. It is thought by some that cabbages, like turnips, produce an unpleasant taste in the milk and butter. It is believed that this is a mistake. Certainly it has not been the case in our experience. Only a few weeks since, we subjected to the taste of a connoisseur an article of butter made in this way, comparing it with another made from well kept cows, but without the cabbage, and he was unable to detect any difference between the two. If any one has acquired a prejudice of this kind, it has probably arisen from the fact that the stumps and decayed leaves have been carelessly fed out with the other parts. If this had been the case, it is no wonder that the milk produced should have an unpleasant taste. The cow, when at liberty, selects her food with sufficient care, but, if confined, in her eagerness for anything green, she is not so particular, and needs to have her food prepared for her clean and sweet.

The relative value of cabbages, compared with other vegetable food, is shown by Professor Johnston, in his Agricultural Chemistry, page 359, where he says: "In the case of the ox, the daily waste or loss of muscle and tissue requires that he should consume 20 to 24 ounces of gluten or albumen, which will be supplied by any of the following weights of vegetable food :—

Meadow hay,	20 lbs.	Turnips,	120 lbs.
Clover hay,	16 lbs.	Cabbage,	70 lbs.
Oat straw,	110 lbs.	Wheat,	11 lbs.
Pea straw,	12 lbs.	Beans, or pease,	6 lbs.
Potatoes,	60 lbs.	Oil cake,	4 lbs.
Carrots,	70 lbs.		

From this table it appears that cabbage is worth as much, pound for pound, as carrots, and nearly twice as much as turnips. This is probably much more than the popular estimates, but is, no doubt, as correct. Among market gardeners the value of the cabbage, and its proper cultivation, are much better understood than with the mass of farmers through the State. The great object with the latter has been to get their necessary supply for the table; and with their method, or rather want of method, they have hardly succeeded in this. In our boyish days, the first sign of gardening operations to be seen in the spring, was a row of cabbage stumps, whose heads had been consumed the preceding winter, looking more hopelessly forlorn and crestfallen, as they literally were, than any line of school-boys enduring the wrath of the master for idleness or mischief. These stumps, or rather the shoots that sprang from them, in the absence of asparagus and other pot herbs, which later improvements have introduced, were the main reliance for greens, and what were not wanted for this purpose, were allowed to go to seed for the next year's sowing. Under treatment so utterly grasping and short-sighted, it is not to be wondered at that this product of a generous cultivation fast dwindled away to its original type, and refused to head. Scarcely less surprising was it, that its cultivators, in their ignorance of the laws of reproduction, should have supposed they could remedy its defects by inverting its position, putting the tops where nature intended the roots to grow. Another bad practice connected with the cultivation of this vegetable has been confining it to old gardens, where it is liable to become club-footed, and so worthless. A better method, however, is beginning to prevail, and the production of field cabbages, both for the market, and as a forage crop, promises to become a permanent and important interest.

The foregoing considerations have induced us to select this as one of the vegetables deserving more particular treatment in this report.

From the great diversity of climate in which the cabbage is found, we rightly infer its hardihood and easy adaptation to different localities. As its home is on the seaboard, however, it is natural to suppose that in such places it will be found in its greatest perfection. And such appears to be the fact. It is presumed that Essex County, particularly in the neighborhood of Marblehead, can boast of a success in this line equal at least to any in the State. We have heard of entire fields averaging the most extraordinary produce of thirty pounds per head. But it yields to good treatment on almost any soil; though what is called a strong soil is as good as any if not *too* cold and stiff. The preparation of the ground, where the best results are sought for, should not be inferior to that for the tobacco crop. It should include two ploughings, with harrowing enough to make the ground light and fine. If it is at all stiff and unyielding, fall ploughing, like that recommended in the cultivation of onions, will be found very beneficial. One point of considerable moment is to have the last ploughing immediately before the plants are set. Especially is this necessary if the ground is at all dry, as it much facilitates their establishment and subsequent growth.

Our own experience leads to the conclusion that composted manures are better than fresh, tending to produce plants of a finer flavor, and less liable to club-foot, and this seems to be the opinion of those who are considered good authority on the subject. Some good cultivators make use of a compost of peat and night soil, well incorporated together. Manuring in the hill is recommended by some, but it is believed that the better way is to enrich the ground enough at the first ploughing to secure a good crop without being obliged to resort to this method. Guano and superphosphate may be used as special fertilizers, and also salt, at the rate of ten bushels to the acre.

Before proceeding further it will be necessary to dwell somewhat upon the production of the plants in their early stages, for upon these depends the value of the crop.

The first point of course is good seed, and this means that it must not only be sound but properly grown, otherwise there is no certainty that the crop will head well. There are some seedsmen who can be depended upon to produce a genuine article, but there are too many that are not sufficiently careful in the matter. There is no need, however, that the cultivator should be dependent on the seedsman for his supply, as by a little painstaking, he can raise his own. Burr's directions for obtaining seed are, to select perfect heads and set them three feet apart each way. As they grow, remove the side shoots and encourage the main sprout, which will push up through the centre of the head. Seed thus cultivated for a few successive years will produce plants, ninety per cent. of which will yield well-formed and good-sized cabbages.

There are many varieties to choose from, among the most popular of which, perhaps, are the early York, said to have been introduced to England from Flanders, more than a hundred and fifty years ago, by a returned soldier, who settled in Yorkshire as a seedsman, whence its name; the Winningstadt, a little later than the York, and a little larger, with a very solid head; the Bergen, raised largely for the New York market; the premium flat Dutch; and the Stonemason, originated by Mr. Stone, of Marblehead.

Having selected a suitable seed bed, which should be fine and rich, prepare it well by ploughing, or digging and raking. Sow the seed in drills about a foot apart, and roll or pat the ground smoothly, so there shall be no lumps for insects to secrete themselves under. The great care at this period will be to have a bed rich enough to give the plants a good start, to have moisture enough to induce an even and quick germination of the seed, and to ward off, if possible, the depredations of the turnip fly. Their attacks are sometimes made before the seed-leaves are fairly visible, and so rapid is their work that the careless observer concludes that his seed has never sprouted. There are various expedients resorted to for the purpose of preventing this mischief, which will be considered more at length in another place. Here it will be enough to say that the writer succeeded the past season in saving his early turnips and cabbages by applications of black pepper and flour sprinkled in the drills while the dew was on, and just as soon as the plants could be seen. The sowing of the seed, should be made about the middle, or last of May. Another, made in the first part of June, may be of service in resetting when the first setting fails, as it sometimes does.

Sowing in drills has these advantages over broadcast sowing—that the beds are more easily kept clean, and applications to ward off the fly are more conveniently made. Besides this, there is a saving of seed in drill-sowing, and the operation of thinning, which should never be omitted where the plants stand thickly, is accomplished to much better advantage when they stand in rows than when scattered irregularly over the bed. This thinning should not be done until the plants are well out of the way of the fly, and they should be left an inch or two apart in order to insure a stocky growth, with a strong stem and abundance of roots. The plants taken up may be set out in another bed, and will be every way as good, but a little later than the others. Fine plants may sometimes be obtained by mixing a small portion of cabbage-seed with that of carrots or beets, where these are sown. In this way, standing singly, they have plenty of room, and being transplanted before the carrots have attained much size, they do no injury to that crop. Some cultivators prepare the whole field, and plant a few seeds to each hill, thinning to one plant when large enough to be secure against casualties. This course has been recommended in regard to the Stone-mason, and, perhaps, the Marblehead Mammoth Drumhead. In common field culture, it seems open to the objection of more care and labor in guarding against the fly, and also, of at least, one extra cleaning of the whole field. This has been our experience, though the objection may not apply to more favored localities.

Transplanting into the field is usually deferred until a rainy time, and when one does not have to wait too long, it is without doubt the best way, though it is not essential. There is a time beyond which it is not desirable to have plants in the seed-bed, and rather than have this much extended, it is best to resort to artificial watering. This time, for a winter crop, is from the first to the middle of July. If the land is backward, they may be set in the latter parts of June. With good management, a crop may be produced after an early crop of peas. The cabbage-plant is tenacious of life, and in the absence of rain, it is only necessary to prepare the ground in the usual way, and after making a hole with the dibble, fill it with water, and set the plant. Another watering within twenty-four hours will be sufficient in ordinary times. This method has been tried in rather a dry time, and in the middle of a bright day, with perfect success. We pass over the operation of setting as a matter with which all are familiar. One point, however, should be observed, which a novice might overlook, and that is to set deep. If the crown of the plant, or inside leaves, are kept free, there is little danger of overdoing in this way. Having secured a good set or stocking of the ground, the after-cultivation consists in keeping it clean and light. Perhaps no vegetable pays better for a frequent stirring of the earth. Stories of wonderful results are reported where this seems to have been the chief means employed, and testimonies in its favor are so abundant that there is no doubt of its great importance.

If the crop has succeeded well, it will be fit to harvest by the first of November, or soon after, though it may stand with safety as long as the weather continues open. If there is danger of the heads bursting previous to gathering, start the roots to stop further growth. Owing to their great bulk and liability to decay, it is a somewhat difficult matter to preserve them in large quantities in our common cellars. One way is to hang them up by the roots; another is to trim off the outside leaves and stump, and pack in barrels; still another is to set them out in the cellar as thick as they can be made to stand. We know of a cultivator who preserves a thousand or fifteen hundred heads in this way in excellent condition.

When the object is to keep them in very large quantities over winter, pits are dug of the size necessary to contain the required number, say a foot or eighteen inches deep. Into these the cabbages are packed as tightly as possible in an upright position, and over the whole enough litter is thrown to protect them from severe frost. A slight degree of frost does not injure them if they are kept at an even temperature. In addition to these methods, they are sometimes pitted by digging a trench in a dry place, wide enough to hold the heads, and about a foot deep. Into these trenches the cabbages are put head downwards, and covered with boards and earth, or litter.

Perhaps, in an essay of this kind, a short space should be devoted to the Savoys, which, though coming under the head of Brassicaceous plants, are regarded by Burr as a distinct family. The Savoy takes its name from the country where it originated, having been introduced from Savoy, more than a hundred and fifty years ago. It is distinguished from the common cabbage in appearance by its more open head, and by the wrinkled appearance of the leaves, which are also of a lighter green than most other kinds, while "in texture and flavor it is thought to approach some of the broccolis or cauliflowers." It is very hardy, but somewhat slow in growth. As a table vegetable it seems worthy of more attention than it has hitherto received. The cabbage, like most other cultivated crops, is subject to the attacks of insects, which are sometimes very troublesome. The first is the fly, or black bug, of which mention has already been made. As prevention is better than cure, we give, in addition to what has already been said on this point, two methods of warding off its ravages. "Steep the seed in a pint of warm water two hours, in which is infused an ounce of saltpetre; dry it, and add curriers' oil enough to wet the whole, after which mix with plaster enough to separate it and fit it for sowing." The other is the following: "After preparing the ground in the usual way for the seed bed, cover it up thickly with almost any kind of combustible rubbish. Burn this to ashes, and rake the ground and sow the seed, and no insects will attack it while the effects of the fire remain."*

Another troublesome insect is the black or cut-worm, which does its mischief soon after transplanting. The only remedy yet known is to hunt for the depredators (the morning is the best time,) and kill them, resetting as often as is necessary. Then there is the Aphis, or plant-louse, which sometimes inflicts serious injury. The writer knows of no remedy for this, but a single incident which came within his observation the past season, may, perhaps, be worth relating. A small patch had been set, and, owing to the extreme drought, was with difficulty kept alive by frequent watering until the rains came. About the middle of August they were almost covered with lice, and many of them promised but little. They were thoroughly hoed at this time, the ground being stirred deeply. In one week's time there was scarcely an insect to be seen, nor did they make their appearance again. Of course no general deduction can be made from an isolated fact of this kind. Possibly others may be familiar with a similar experience, and it is only with the hope of drawing it out, if such is the case, that this has been introduced.

The club-foot is a disease causing, or showing itself in an enlargement of the roots. If it appears in the early stages of growth it is very apt to prove a fatal injury. It is most common in old gardens, or where the cabbage has been cultivated before. The remedy is to plant on a fresh piece of ground every year. Notwithstanding these drawbacks it is believed that this crop is one of the surest and most profitable that can be grown. It also has this advantage, that if it is difficult of sale at any time, the *home* market is sure and fairly remunerating.

The depredations of the cut-worm may be in part obviated by late setting, say from the tenth to the fifteenth of July. Prevention of the striped bug: insert a stick, an inch square on the top, in the centre of the hill, the top of the stick to be left four to six inches from the surface. Open the hill, spread a newspaper over, and cover the edges with earth. The stick keeps the paper from the plants, and the paper shuts off the bugs.

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* Gardener's Assistant.

THE SQUASH.

The introduction and use of the winter squash is of comparatively recent date. Its origin is involved in obscurity; but from the fact that ancient writings contain no allusions to it, and that older European authors are equally silent in regard to it, it is reasonable to suppose that like the potato it is a gift to civilization from the New World. Its original home is supposed to be somewhere within the American tropics, whence it has spread over a large part of this country and Europe. As a table vegetable it takes rank with the onion and the turnip, while for pastry purposes it is perhaps second only to the apple. It must be confessed, however, that it is not a great favorite with the masses, owing, perhaps, to its expensiveness and the care necessary in its preparation for the table. With those, however, whose tastes and means require a variety of dishes, the squash, from its delicate flavor and fine appearance, will always be regarded as a necessity. These considerations will make its cultivation by market gardeners in certain localities a matter of considerable importance.

The change which has taken place within seventy-five years in regard to the use of this and some other vegetables, is quite remarkable. In the last century, the pumpkin was principally used for all those purposes for which the squash is now considered indispensable. Even later, and within the memory of comparatively young people, New England was famous for its pumpkin pies, while those made from squashes were comparatively unknown.

At length the crooknecks were introduced, and became popular; and these in turn, have been, in good part, superseded by the improved varieties. There is frequently considerable difference in texture, flavor, &c., in specimens of the same variety, and we have no knowledge of any method by which they can be produced of a uniformly first rate quality. In this particular, approximation only has hitherto been attainable.

The varieties are numerous and too well known to need any description here.

They are in name the Crooknecks—Canada and Large—the Autumnal Marrow, the Hubbard, and the Turban. This last, though perhaps not so well known as the others, has great merit, and promises to become a favorite. One of its peculiar qualities is its solidity, which, the squash being an article of great bulk, is an item of considerable importance in winter preservation. It is a curious fact that two of the kinds mentioned above, the crookneck and the autumnal marrow, are supposed to have been introduced by the Indians.

Champlain found the bell-shaped species, from which came the crookneck, among the Northern Indians in 1605. And Mr. John M. Ives, of Salem, who introduced the autumnal marrow to public notice, says, in a letter to Mr. Burr, giving an account of its origin, that he received the first seeds from a friend of his in Northampton in 1831, and that he was afterwards informed by this gentleman, "that the seeds came originally from Buffalo, N. Y., where they were supposed to have been introduced by a tribe of Indians, who were accustomed to visit that city in the spring of the year." The squash thrives well on any rich warm soil, though newly cleared or broken sward-land is said to be the best for it. Being a native of a tropical climate, it is sensitive to cold, and should not be planted until the ground is warm enough to insure germination. The hills should be made from six to eight feet apart, and a dozen or fifteen seeds planted to the hill. They should be prepared by digging holes eighteen inches in diameter, and one foot deep, which should be nearly filled with well-rotted manure. Over this should be drawn a little earth, on which the seeds may be dropped, and covered to the depth of an inch. If the soil should be stiff and unyielding, it is an excellent practice to cover with very light sandy loam, or even with sand alone, if care is taken not to let the surface get too dry. The object is to have a loose surface for the seeds to push through when they germinate. When clayey soils become packed, as they sometimes do after a hard rain, it requires considerable force to break the crust, sometimes more than the germinating power possesses, in which case the plant is crippled, or even crushed from the beginning. We have sometimes seen in such cases, the ground broken for the distance of several inches in diameter, and raised to an angle of forty-five degrees, to make room for the shoot. It may be remarked here in passing, that it greatly facilitates the coming up of all flat-shaped seeds, those which literally *come up*, to plant them in a vertical position, and cover loosely. So necessary is this, that in some cases, in planting the Lima Bean, for instance, the best way is said to be to lay them on the top of the ground, which probably means to give them the lightest covering possible to secure sprouting. A strong compost made of night soil and common earth, is a valuable dressing, causing a rapid and luxuriant development of the seed-leaves, thereby lessening the chances of injury from insects, while the manure itself is said to have the effect of driving them away. The critical time for the squash is just at this period. Its enemies are the striped and the so called squash bug. A pretty effectual way of destroying the latter, and to some extent the former, is to lay a broad shingle by the side of each hill as soon as the plants are up. The bugs seek the under side of the shingle for shelter in the night, and are easily killed early in the morning. From the fact that the striped bug commits its depredations on the under side of the leaf, it is difficult to reach it. Soot, lime, elder leaves, ashes, plaster, charcoal-dust, &c., are recommended. We have seen, within the past year, a pyramid-shaped net, with a stake at each corner for fastening it into the ground, which must be a very good protection, and would not be expensive for ordinary garden purposes.

If the crop escapes injury from insects, its growth is rapid. The plants should be thinned down to three or four to the hill, and the ground kept clean by frequent stirring, until the vines cover the surface.

Before the frost comes, the squashes should be picked and removed to some cool dry place. They should be handled with care, and should not be laid in large piles, as every bruise injures their keeping qualities.

They are best preserved in the winter in a dry atmosphere, with a temperature uniform, and but little above the freezing point. Large cultivators are in the practice of fitting up buildings for this particular purpose, where the squashes are arranged on shelves, so they can be easily examined, and where, of course, the temperature is regulated by artificial heat.

In our enumeration of varieties, not only of the squash, but of the onion and cabbage, we have purposely omitted, not only the description but the names of a large number, choosing rather to turn attention to a few well-known and standard kinds than to occupy space and divide attention by allusions to those which have but little intrinsic value to recommend them, or which, if really as valuable, are not so much sought after as those we have mentioned.

Some discussion followed the reading of the Essay, relating chiefly to the modes of preparing bones for use as a fertilizer.

The Report was accepted.

The next subject, presented by the Committee on the Management of Forest Trees, was the

CULTIVATION OF THE PITCH PINE ON THE SEA-COAST.

BY S. B. PHINNEY.

Thirty years ago the planting of the pitch pine commenced upon the worn-out lands in Barnstable County, as a profitable investment, and strips or bounds by the sea-side, especially on the south and east shores of the Cape, to protect the lands within, and to prevent the sand from blowing and forming extensive dunes, like that in the centre of Wellfleet, and other places upon the shores of Cape Cod.

Nineteen years ago, S. B. Phinney planted, near the village of Barnstable, upon poor, worn-out land, ten acres with the pitch pine seed, which has proved both successful and profitable. A large portion of the trees upon this plantation will now measure in circumference from three to three and a half feet. The method adopted in planting this lot was by ploughing shallow furrows four feet apart, and dropping the seed about the same distance between the furrows. Vacancies where seed did not vegetate, were replanted the second year.

Amos Otis, Esq., of Yarmouth, is probably the largest cultivator of the pitch pine in this State, and has advanced as his theory, the successful experiments which have been made in Scotland, by planting wide borders of larches by the sea-shore, showing that the land lost to cultivation, was more than compensated by the increased fertility of the land within, and that the wood and timber, was a net gain to the owner of the soil. It is found that by the planting of the beaches on the coast of France, with a variety of the pine, the sands had become fixed, and lands formerly worthless had become valuable. These views were then deemed visionary, but now, the planting of the pitch pine is considered as safe and as profitable a crop as can be raised on light, sandy soils. That which thirty years ago was experimental and uncertain, is now considered safe and profitable.

In the year 1832, Mr. Otis bought two acres of poor land, and made thereon some experiments in planting forest trees. He planted pitch pine, oak, chestnut, and balm of gilead. This small experiment proved that a profit would be realized by planting the pitch pine, and he accordingly bought from time to time, about one hundred and fifty acres at an average cost of one dollar and fifty cents per acre. He kept an account with three several tracts, and knows the exact cost of each. But it is not necessary to particularize,—those who are seeking information on this subject want general results.

At first he ploughed the land into ridges, planting on the ridge and in the bottom of the outside furrows. The seed planted on the ridges did not germinate as well as that planted at the bottom of the furrows. Afterwards he ploughed furrows, about eight feet apart, and planted by hand, in the bottom of the furrows. This was an expensive method, and is now discontinued; yet if a man has only a few acres to plant, it is a method to be recommended, substituting a common planting machine or seed dropper, to planting the seed by hand.

In 1839, he had a machine constructed to plough a shallow furrow, and to drop and cover the seed at one operation. With this machine, which cost less than five dollars, a man and a horse could plant five acres in a day—thus reducing the cost of planting to fifty cents the acre. Some improvements have since been made in the construction of pine seed planters, and they are now generally used.

The pine seed costs about one dollar per quart, cleaned and ready for use. Half a pint, if evenly planted, is sufficient for an acre; but as there will necessarily be some loss, it is better to use a pint. If the trees are too thick at first, they will die out, and no material damage will ensue.

Insurance against fire is an element of cost which should not be overlooked. A few years ago, woodland was considered the safest of safe investments; now, fires in the woods are of frequent occurrence, rendering that species of property as hazardous as any on which policies are issued by insurance companies.

It is estimated that if all the lands in Barnstable County, planted to pitch pine between the years 1836 and 1849, were to be offered and sold at auction, they would bring an average price of more than fifteen dollars per acre. Several tracts could not be bought for twice that sum. Small lots could be selected, planted twenty-five years ago, in favorable locations, where the present growth of wood is worth at the rate of thirty-five or forty dollars per acre, the original cost of the land and planting not exceeding five dollars per acre. Many *thousand acres* have been planted in Barnstable County, and the pitch pine is now considered as certain a crop as can be planted. The days of *experiment* have passed.

Several years since, a large importation of Norway pine seed was made at Nantucket. Much of it was planted there, and considerable quantities in other portions of Eastern Massachusetts, but it was not found to be adapted to the soil and climate. It germinated well, but very many of the young plants were killed by the drouth the first season, and from one cause and another, nearly all that was planted are now dead. In Nantucket very fine groves of young Norway pines, planted from the seed, are to be seen;—but there the pitch pine is preferred. The white pine succeeds better some eight or ten miles from the sea-coast.

A variety of pine, the seed whereof was imported from France, and thence called the French, has been tried. It is a beautiful evergreen, and is said to be the kind which has been so successfully cultivated on the coast of France. A few that have been planted on loose sand have grown tolerably well. If this variety will grow on the beaches of our sea-coast, it would be well to plant them as a screen to protect the lands within.

The conclusion at which all in Barnstable County have arrived, is that the pitch pine is the most profitable forest tree that can be cultivated. In other portions of the State, there are probably other trees that could be more profitably cultivated.

The soil best adapted to the pitch pine is a yellow, sandy loam, a soil containing so little clay that it will not bake or crack. When the pitch pine grows naturally, loam or gravel suitable for the repair of sandy roads is very seldom found. On a loose, barren sand it will not grow without the surface of the ground is covered with some material that will prevent the sand from being moved by the winds. In places where the limbs of pine trees have been thickly spread over loose sand, a fine growth of pines often comes up from the seeds which drop from the cones. The wood grown on such lands, however, will never repay the labor of planting; but there are other conditions which make it advisable. Heavy loam and clay soils are better adapted to other varieties of trees. The soil which is recommended for planting the pitch pine, would be a sandy soil, worn out by repeated crops of corn and rye.

The farmer can judge whether or not he has soil adapted to the profitable cultivation of the pitch pine. If he has, his next object is to procure good seed. Some botanists, called learned, state that it requires two years for the pitch pine to mature its seeds. This is a mistake. The proper season for gathering the cones, is the last of October and the beginning of November, before the burs of the cones are opened by severe frosts. Some years seed is very abundant; in others very little can be procured. Select the cones of the growth of the current year, not those of two years, *as the learned botanists say*, and spread them thinly on a tight chamber or garret floor, and let them remain till spring, when wanted for planting. It is well, however, to turn them over occasionally in the winter. If the room is well lighted, and has a southern aspect, much of the seed will drop out. The cones that do not open can be put in pans and placed in a slightly warm oven, or can be spread singly in the sun. In either case the cones will soon open, and the seed can be knocked out. In putting them in an oven, or by the side of a stove, care must be taken not to expose them to a strong heat, which destroys the vitality of the seeds. After it is separated from the cones, the wings must be rubbed off, and the seed cleaned by sifting and winnowing. A bushel of cones will ordinarily yield a quart of clean seed, though double of that quantity is sometimes obtained.

Last year cones were very abundant, and were sold at the low price of fifty cents a barrel. Usually the cost of procuring them is about seventy-five cents a bushel. It is better and more economical for a man to buy the cones than the cleaned seed, because it is difficult to distinguish that which has been injured by over-heating, from that which has not.

If a farmer has a large tract to plant, it would be advisable for him to procure a seed-planter, which will cost about five dollars. If he has only a few acres, a cheap method is to furrow the ground one way, in rows from six to eight feet apart, and drop the seed in the bottom of the furrows with a common seed-planter, covering it about half an inch deep.

There is another way to which the pitch pine can be applied, to which it is well to call attention. As a border for the protection of cultivated fields, especially gardens, it is well adapted. The dry south-west winds which prevail in some sections of the State, in the spring and summer, are more injurious to vegetation than other winds. Many kinds of fruit trees, that are unprotected on the south-west, soon become unfruitful and perish. A border two rods in width, thickly planted on the south and west of a garden, will add much to its fertility. Trees and shrubs that would not grow at all, will, thus protected, flourish and bear abundantly.

Those who have gardens near the sea-shore will find it greatly to their advantage to plant, as a screen, a belt of forest trees between the sea-shore and their gardens. Such screens, besides the advantage they are to the growing crop, will add to the fertility of the soil by preventing the finest and richest portions from being blown away, and by arresting the particles blown from the neighboring fields. For the same reason, the soil near old ranges of stone wall is better than at a distance.

In the discussion that followed the reading of the Essay, Dr. Hartwell, of Southbridge, stated that the white pine would grow twice as fast as the yellow pine, and, in fact, nearly four cords of white pine could be grown in the same time, and on the same land as one cord of yellow pine, but the pitch pine might be more profitable on the poor soils of Barnstable County.

Dr. Loring called attention to the fact that on the stronger soils of Essex County, the plan described by Mr. Phinney, of planting in furrows, had not succeeded in the planting of oaks, and other forest trees. The water would often stand in the furrow, and the freezing and thawing of winter would destroy the young plants, while seeds which had fallen by accident on the top of the furrows, had grown well. This might not be the case on a very light and porous soil, where the water would not stand. The Norway pine would not endure the exposure to the winds near the sea-shore.

Prof. Agassiz, of Cambridge, said that we should never forget one fundamental law of the natural distribution of forest trees, and in our attempts to convey information upon such subjects, the different elements which affect the growth of species, as elevation above the sea-level, distance from the sea-coast, etc., should be considered. We want most careful investigations in regard to the geographical distribution and range of plants in this country, and the Board could do much to encourage such investigations.

Mr. Phinney said that where corn will grow well, the pitch pine will not always succeed. The seed will be more likely to fail. It is in a light, sandy, and exhausted soil that it seemed to do best.

Mr. Taft, of Upton, mentioned, as an interesting case of the profitable natural growth of wood, that on a piece of woodland within his knowledge, where the wood was cut off nearly thirty years ago, and the land sold for seven dollars and a half an acre, and allowed again to grow, the wood alone had been recently sold for sixty-five dollars an acre, cutting about forty cords, thus paying the original price of the land with compound interest at six per cent. for the period of its growth, and seven hundred dollars in addition, the land being left besides.

The Report was accepted and ordered to be printed.

The Committee to whom the subject had been referred, then presented a Report

ON FARM BUILDINGS.

BY C. O. PERKINS.

The degree of civilization, the wealth, and the general taste and refinement of a community, or of individuals, may be judged, with great accuracy, by a glance at the surroundings of their home. From the Indian, living in his wigwam; the Greenlander, living in his hut of ice; the wandering Arab, taking his tent with him, or the cottage of the domestic peasant of the nobility-owned soil of Europe, (so domestic, that his brutes are tenants of the same roof,) we may pass through all the various stages of civilization to the clean, comfortable, beautiful, convenient and best arranged premises of the New England farmer, with a variation according to means, location, and taste, which is only equalled by the natural scenery which surrounds him, but evincing, in the aggregate, the greatest amount of thrift and refinement, and, withal, so beautifully dotted with school-houses and church-spires, indicating universal education and the Christian religion.

THE NEW ENGLAND FARMHOUSE.

Tastefully kept, carefully designed with reference to convenient location, convenience of internal arrangement, beauty of form and proportion, draped, perhaps, in tasteful simplicity, with festoons of living vines, and with surrounding ornaments, of flowers, and of shade and fruit-trees; occupied by the intelligent and warm-hearted farmer, with his neat, tasty, frugal, industrious and affectionate housewife, their cares and labors being lessened by the aid of sons bearing the image of the mother, and by daughters in the likeness of the father, and who, through the diligent training of the experienced parents, are the aspiring candidates to like positions,—all these, and even more may be seen in the rural portions of every New England town, and in no place on earth do we find nearer approaches to the Garden of Eden, or a nobler or purer type of that being who was made in the image of God.

THE FOUNDATION

of all buildings should be effectively permanent. We have seen cellar walls and underpinnings that have stood one hundred years without change or variation; and again we have seen buildings ruined from want of proper foundation before they had stood one-tenth of that time. We sometimes see the upright part of a house with cellar underneath and permanent foundation, with a wing attached without cellar or sufficiently permanent foundation, and every winter the frost breaks the joinings of the two, making periodical work for the mechanic and inconvenience for the occupants.

Let all foundations for buildings extend below the frost and be substantially made of enduring material. Neither clay, muck, nor loam should be allowed in contact with foundation walls, but small stones, gravel, and coarse sand, not being retentive of moisture, are suitable banking material. The surface of the ground around all buildings should be so graded as to turn all water from foundation walls.

ARCHITECTURE.

The architectural construction of farm buildings should vary with the location, with the purposes to be attained, with the amount of capital to be employed, whether to be built with reference to economy or ornament, appearance or usefulness; and the style of finish may be varied with the taste of the proprietor, whether the plain Tuscan or the more masculine and grand Doric, the lofty-pinnacled Gothic, the light and elegant Ionic, the delicately-beautiful Corinthian, or the Composite, being the combination of the last two orders. But convenience and permanent durability should never be lost sight of, and all increase of corners, projections, or indentations will be attended with a corresponding increase of expense and complication of repairs. No one plan or order is desirable for all; besides, were all buildings from one pattern, the sameness would become monotonous and the eye would not find that pleasant relief which it now enjoys.

GENERAL PRINCIPLES

with view to economy. The nearer square any building the greater the solid contents in proportion to the external surface. The roof being the most exposed and the most subject to decay, should cover the greatest amount of space which may be effected by increased height of the building, and as before expressed, by bringing the building nearest to a square form. Roofs with view to economy should not be less than the Roman, or two-thirds pitch, and perhaps the Gothic, or a pitch equal to the width may be still more economical. Flat roofs should be avoided. The penetration of driving storms is greater upon them. Any slight defect is more easily penetrated by water. The snow in winter forms a lodgment upon flat roofs, the weight endangering the building. Roofs should project from two to three feet over and beyond the walls of buildings, protecting the walls from storms and the hot sun. Slate, tin, and shingles, each have their advocates. Slate may be the most desirable in many locations. Good rived shaved pine shingles make a good roof, that without paint will last forty years, and with paint, may last twice that time. Good rived hemlock shaved shingles will last thirty years. Sawed or machine-cut shingles are to be avoided, as some of them being cut across the grain, soon water-soak and decay, spoiling the roof. Good sound hemlock, free from knots and shakes, straight-grained, sawed one-half inch thick, and seven to ten inches wide, cut twenty-six inches long, and laid one foot to the weather, the first course being cut fourteen inches long, makes a very good roof—will last some thirty years, and is much better than sawed or machine-cut shingles, and many times may be profitably used on barn buildings. If paint is used on the roof, it should be of a light color, as dark colors draw the heat and crack and warp the shingles. A tin roof gives the coolest attic.

The farm-house should be designed with direct reference to health, comfort and convenience. A two-story house is more desirable than less. It has a generous look of comfort, which a lower building, however tastily set off can never represent. It gives cool and comfortable chambers in summer, and attic room besides, which always comes in play. The attic floor should never be less than two feet below the eaves, giving access to the whole room. The second story should be at least eight feet in the clear, and the lower floor nine, and each may be as much more as the occupant desires. The cellar should clear at least eight feet, and be so arranged as to have a permanently dry bottom; by filling around the walls of the building, at the ends of the joining at each floor, the rats may be cut off from any incursions. If possible, give the room to be daily occupied by the family the front and sunny side of the house, as the parlors are, most of the time, to be kept dark. The dark side of the house is best adapted to their use. The sun is nearly as necessary to the life and health of mankind as to vegetation. The kitchen should be of easy access to water, to the wood, to the cellar and to the pantry; should be of liberal size with large sink. (Cast iron is best. If it endangers dishes, put a wide board on the bottom.) Stairs should be wide, with easy pitch and broad tread. The wood-house and the privy should be connected with the house, and it is unnecessary they should be projections. It is desirable that chimneys have their foundations from the bottom of the cellar, and with proper arrangements in the chimneys the necessity of ash and smoke-houses may be avoided. The house that embraces the most conveniences, and covers the most wants under one roof, with the least ells, wings, nooks, corners, and projections, with a reasonable reference to taste and due proportions, may be said to be the most economical, and will prove most satisfactory in process of time.

WATER.

There is scarcely a set of farm-buildings in New England that cannot be economically furnished with constant running water. The make of the land is admirably adapted to that purpose, and any necessary outlay in that direction will well pay. Water can now be brought nearly as well up-hill as down. We have in our mind one of Douglas's hydraulic rams that has been in constant operation for eighteen years, affording an abundant supply of water for a large family and large stock of cattle; supplying house, horse-barn, cattle and sheep. The water is brought sixty rods, with a rise of forty feet, and the yearly expense has not exceeded twelve dollars, including interest on the first investment; whereas, formerly, the water for especial family use was drawn from a well thirty feet deep; the washing water from a cistern, the horses watered at a pump, the cattle driven sixty rods in the highway, (manured by their droppings,) and the sheep ate snow.

INCONVENIENT EXPENSE.

We sometimes see no less than some ten or a dozen buildings and appurtenances scattered about to make up a complete farm set. First, a house, with a well located off across the road somewhere, and an inconvenient wood-shed, with little or no good wood; then an ash-house or a smoke-house; next a hog-pen and poultry-house, then a granary, then wagon-house, and perhaps horse-barn, then one or two cattle-barns, and then a sheep-barn. And the farmer has most of these buildings to visit to accomplish his routine of stock tending. And perhaps you will see in connection a small front yard, a side yard or drive-way, another back yard; and, off at one side, a garden, perhaps picketed to keep the fowls out. The repairs of fencing, roofing, silling, &c., are constant, and never done.

BARNS.

Economy and convenience suggest one large, commodious barn, that may answer for cattle, horses, sheep, swine, granary, wagon-house, &c. Let the farmer shape the size of his barn to his farm, and embrace all under one roof. Barns should have a basement, and two stories above the basement will afford the most room with the least expense. The basement should clear nine feet, and the story above the basement ten feet, and the story above not less than twelve feet, making twenty-two feet above the basement. This, with a not less than two-thirds pitch roof, will afford room, which the thrifty farmer will never regret. The basement may be appropriated to manure, swine, sheep, young cattle, poultry, and storage for various large farming tools. The first floor above the basement may be appropriated to horses and cattle on one side the main floor, and to hay, granary, and carriage-house on the other side; the second floor to hay, granary, store-room, &c.

A barn 46×46, with basement nine feet in the clear, posts above the basement twenty-two feet, making the first floor ten feet, and the second twelve feet clear, will stow about thirty-four tons of hay below the eaves, and as much more above. The plan may be shortened or lengthened according to the wants of the farm. If shortened, the roof may run the other way, but the floors should be unchanged. The advantages of this barn are, that it gives the convenient width, embraces all barn wants in a compact and convenient form, and, it is believed, with the least expense.

It brings the swine where they can intermix their own and the horse and cattle manure; also the sheep manure may be thrown therewith. This plan contemplates taking the advantage of land naturally adapted. The surface of the ground may come to the top of the basement on three sides—the first floor having doors at both ends, and the second floor having an abutment, and bridge and doors at one end only. One of the 12×20 spaces on second floor, devoted to hay, may be used for a corn-house to good advantage, if desirable. The manure can be removed through the open space of basement, and manure-making material may be added through apertures on the back side. The large floors will serve, at certain seasons, for additional storage. There may be a portion cut from back side of granary and stairway, on first floor, for tool-shop. The cattle should stand on plank laid upon the main floor and running back from the manger four to six feet, according to the length of the animals. The plank should extend up to the manger, but not under, that when worn or decayed they may be easily removed. Stanchions are the most convenient way of fastening cattle, and sufficiently comfortable. Behind the cattle there should be a gutter and movable plank for removing the manure. Horses should also stand upon plank laid upon the main floor; six feet from the manger back is a suitable length. The floors should pitch back about one inch in six feet, and the same with cattle. Feeding mangers for horses should be raised at the bottom only about six inches. A manger two feet wide and deep, and three feet long, is just the thing. Horses never get strained in the withers or contract the heaves by feeding from low mangers. High mangers give the dust a chance to enter the horse's nostrils, endangering the heaves; besides it is not the way nature designed horses to feed, and high feeding mangers are always attended with danger to the wind, forward limbs and back of the horse. A perpendicular plank, running up at each side from the front of the manger, will prevent horses from throwing out their feed.

Large barn doors should be hung with pulleys from the top, running on the outside of the barn. It is not so much matter with smaller doors, as they are not so easily affected by the wind. The arrangements of cross-beams about the hay-bays should be constructed with reference to the use of the horse-pitchfork, as it is a great labor-saving implement, and can be used by boys at a time when men's help can scarcely be obtained. The twenty foot bay, twenty-two feet deep, may be filled by laying three ropes across the hay rigging before it is loaded, and by attaching one end of the ropes, when the load is to be unloaded, to the floor-girth; and with a set of pulleys suspended from the rafter and attached to the other end of the ropes and the use of a horse, the whole load may be removed at once.

So many authors have written upon country residences, and cottage and farm-houses, and have furnished plans, that it would seem that very little could be added by those who have not made the subject their professional study. But upon barn buildings there has been less written, leaving a greater want with the public, which is an excuse for having gone into the matter in more detail.

CONCLUSION.

Neither for looks nor convenience is it desirable that the farmer should surround his premises with a multiplicity of small buildings. With a farm-house and barn built with reference to covering all wants, the necessity for a multiplicity of small buildings, small yards and small lots, is obviated. The amount of mechanical appliances to increase man's laboring powers has greatly increased within a few years, and is still increasing; and to facilitate their use on the farm, it is desirable to do away with small lots and short corners. The one indicates contraction of thought and action, and the other a generous expansion of both.

A discussion followed upon some of the points suggested in the Essay, and many interesting facts and statements were elicited.

Mr. HOMER said that it was better that horse-stalls should be so arranged that the pitch should be towards the manger. The horse should stand so as to bring the most of his weight upon his fore legs.

Mr. TIDD said that pains should be taken in the cow-stalls not to get the platform too long. The trouble of taking care of a stock of cattle would be increased by having a platform longer than was needed.

Mr. THOMPSON had constructed many barns in which many of these points had been carefully considered. As to the length of the platform for cows, it should be from four feet to four feet six inches, for cows of ordinary size.

Mr. LATHROP said that the platform for oxen should be six feet long. He would never use stanchions, as he did not consider them well adapted to secure the ease and comfort of stock.

Mr. MOORE stated that the dairy farmers of Middlesex County were changing their mode of tying from chains to stanchions, on account of the greater cleanliness of the animals in them. Customers were apt to find the milk of cows tied so as to be able to move back with the freedom which the tying with chains gives, rather objectionable.

The Report was accepted. The next Report presented was

ON FRUIT CULTURE.

BY JOHN B. MOORE.

The Committee on Fruit intended to continue the subject of nomenclature, which was so ably commenced under the direction of the former chairman of this Committee, but from the very small crop and unusually poor specimens of fruit the past season, have thought it judicious to omit the continuation of the subject the present year; and instead thereof will offer a few thoughts upon the present conditions of the apple-orchard and its future crops of fruit; and also upon the pear, peach, and cherry.

It is well known to the farmers and fruit-growers in the vicinity of Boston, that it is much more difficult to produce good apples now than formerly, and that the relative proportion of good or number one apples is much smaller at the present time than ten or fifteen years ago.

This result is mainly owing to the very great increase of insects destructive both to the fruit and foliage of the trees; the two most destructive to the fruit are the curculio and the codling-worm. These worms, we think, could be checked to some extent by picking up all the fruit falling from the trees every few days, and submiting them to some process that would destroy the larvæ of all insects therein.

The former practice, before the excitement upon the temperance question, was to pick all the little apples, even not much larger than walnuts, and grind them up for cider. Of course, insects subject to that operation would be destroyed, and the quantity of cider increased, if not improved; the flavor of it, however, if made from such apples as we have had the last season, would be decidedly meaty; and some of the drinkers of it, in these days of *petroleum*, might be excused if they should conclude that they had "struck *ile*."

Now, this gathering of the immature fruit quite often, and grinding it up for the purpose of making cider, or submitting it to any operation that will cause the destruction of the insects contained therein, will of course make the next crop of fruit average better, as there will be a less number of insects to prey upon it than if this had not been done.

These small apples, which drop from the trees first, have nearly all been punctured by the curculio, many of them perhaps a dozen times; and there are really more worms in one quart of those small apples than in a barrel of fruit which has attained its full size: hence the importance of picking up the fruit when quite small, and destroying the larvæ before they have left it for the ground.

The principal insects which attack the foliage of the trees are the canker-worm and the common caterpillar. The former has destroyed most of the fruit in the immediate vicinity of Boston for many years; and there has been quite a number of plans to check or stop the ravages of this very destructive insect, none of which appear to be entirely successful.

The common caterpillar can be kept under by constant vigilance. The best and easiest way of destroying a large portion of them is by picking off the eggs, which can now easily be found on the small twigs, and burning them. Whatever is missed should be exterminated immediately after hatching, as then it is much less trouble than it would be if they had attained their full size.

These, although they are not the only insects which attack the foliage, yet they are the ones that cause the most trouble and destruction to the crop; and these insects, together with the borer, which can be more easily managed, are now the principal drawbacks which the orchardist has to contend with, which, with the increased price of land near large cities, renders it doubtful if it would be profitable to plant out apple-orchards in their immediate vicinities, or where land suitable for orcharding is worth one hundred and fifty dollars per acre,—land of that value and in such locations paying better with some other crop.

And the fact that owners of apple-orchards near Boston, the trees of which are now just in their prime, are having them dug up, and the ground cleared entirely of trees, for the purpose of growing some other crop on the land rather than apples, goes to prove that it is either unprofitable to raise apples, or more profitable to grow some other crop on land so valuable.

And therefore we cannot arrive at any other conclusion than this: that the apple cannot be cultivated in the immediate vicinity of our large cities, where the land upon which the orchard is grown is worth one hundred and fifty dollars or more an acre, profitably, but that it may be extended, with a reasonable prospect of paying, at some little distance from such places, if the owner is willing to give good cultivation, and to look sharp after the insects.

And although the location may be more than fifty miles from market, it should not prevent the owner from planting trees, but should rather encourage him to do it, for these reasons: first, there are less insects; second, if near a railroad, the expense of transportation will not be much, if any, more than it would by horse-power, ten or fifteen miles, which is the usual method of delivery near cities; and then, perhaps, it is a crop that will pay as well as any that distance from market, and can be transported as easily and safely as any other.

We often hear the remark that our orchards are fast going to decay. That is true in one sense, for after trees have borne their crops for many years, and have passed their maturity, and in their old age have lost their vigor and fruitfulness, they, like all other products with which this earth is stocked, either animal or vegetable, must travel that same down-hill road to decay; and we can hurry them along in that path by neglect, both in cultivation and in the destruction of insects, or we can extend their usefulness by an opposite course. Which method we shall pursue is a question every orchardist must answer for himself.

The habit of deep ploughing in orchards, we think, is detrimental both to the longevity and health of the trees. Suppose there are not more than eight or ten inches in depth of soil in an orchard, (and that is as deep as the soil of most of our orchards,) and after planting the trees the ground is annually ploughed eight or ten inches deep. Of course all roots of the trees will be destroyed as deep as the plough goes, and whatever roots are left to the trees are in the hard and cold subsoil, driven there against these repeated attempts to get into a more congenial and nutritive soil, and contrary to the nature of the tree, which, if left to its own instincts, will always spread its roots near or within a few inches of the surface of the ground.

Will not deep ploughing, then, by forcing the roots of the tree into a hard, wet, cold, and unnatural subsoil, produce disease and decay? We think it will. And as cultivation and stirring of the soil are necessary, let the orchard be ploughed shallow, or mulched with leaves or cheap hay.

On almost every farm there are more or less acres of rough, rocky land, unfavorable to the production of the various hoed crops, or for mowing fields. This land is often the most suitable for the apple-orchard, and should be appropriated for that purpose, rather than the smooth and more level lands of the farm, which are better adapted to the other crops.

Should not there be some moral or legal means applied to prevent the extension, and to cause the destruction, of the common caterpillar? The legislature of this State, by the suggestion of the Board of Agriculture, very properly made a law causing all dogs to be licensed, and all damage to sheep killed by dogs to be paid for out of the fund accumulated from the fees for the licenses. That is right. If a person has twenty-five dollars' worth of sheep suddenly converted into mutton and dog-meat by his neighbors' dogs, he gets his pay for it; but if he has a valuable orchard, in which he has spent time and money to have all the caterpillars destroyed, and his lazy or shiftless neighbor has an orchard near, the trees of which are covered with caterpillars' nests, and by not being destroyed are allowed to attain their perfect organization, and to fly over and deposit their eggs on his trees, and thus do him a damage, by causing him a large amount of extra work the next year to exterminate them, he has no dog fund to go to, and gets nothing for it. Should it be so? We think not. Every person's duty to his neighbors and to the public requires him at least to extirpate, as far as he can, the insects on his own trees; and the future condition of the apple-crop, if the ravages of the insects are not diminished in some way, must be seriously injured, both in quantity and quality.

The cultivation of the pear increases quite rapidly, particularly in the gardens near our large towns; and this fruit, although much more plenty than a few years ago, still commands a fair and remunerating price in our principal markets, and they are not glutted with this fruit, as many have heretofore thought they would be; and there are now almost as many bushels sent to market as there were single pears twenty years ago. And it indicates that the consumption of this delicious fruit is not now confined to the few, but that it is becoming general and extensive throughout the community.

The peach and cherry seem to be fast leaving us, the former from that insidious disease, the yellows; the latter, either from some injury to the trees from the winter, or from the ravages of the black aphis, or from both, is fast going to destruction. There does not appear to be any certain or efficient remedies for the complaints of either the peach or the cherry. The extinction of either one would be quite a loss; and we hope that some remedy may be found that will save them, as we now have so few varieties that we cannot even afford to lose one of them.

The Report was accepted.

Mr. PERKINS moved to abolish the requirement of the Board that grain and root crops should be weighed by competitors for premiums offered by the county fairs.

The motion was specially assigned for Saturday, the 28th.

SATURDAY, Jan. 28th.

The Board met on Saturday according to adjournment. The subject first under discussion was the motion of Mr. PERKINS, of the Berkshire Society, to discontinue the requirements on the part of the Board, whereby the societies are compelled to cause crops entered for premiums to be accurately weighed or measured.

The chief reason urged for the repeal of the requirement was that it was a source of inconvenience and expense, and that the result was, after all, unsatisfactory.

Mr. MOORE, of the Middlesex Society produced a copy of the reports of the Berkshire Society, as returned to the Board, printed only in a newspaper form, and showed that they could be of little use to the State. No detailed statements appeared as to how crops were raised, no estimate, even, of the expenses, no reliable data, which could serve for the instruction of farmers in other parts of the Commonwealth, or even in the immediate vicinity where they were grown. Such returns were not what the State had a right to expect. They could add nothing exact and valuable to our stock of knowledge on the subject. They could serve no good purpose.

Dr. LORING, of the Essex Society, said, as a member of the committee which prepared the blanks to be used by the societies, that the Board had tried to make the requirements as practicable and as little burdensome as was consistent with the idea of getting some value in return for the money which the State was paying for the advancement of its agriculture. He proposed some modifications in the blank which would meet any reasonable objections which could be made to the present requirements.

Mr. TAFT, of the Worcester South-East Society, advocated the amendments, and said, in reply to the assertion of Mr. Perkins, that farmers would often deceive the committee, and swear to statements which were not true ; that, as a general rule, farmers were an honest class of men, and that if cases of deception and perjury had occurred in Berkshire, or any other county, the individuals by whom it is practised should be forever after debarred from competing for premiums.

Messrs. GARFIELD, of the Housatonic Society, GROUT, of the Middlesex South, LATHROP, of Hadley, and TIDD, of the Worcester West Society participated in the debate, till it was

Voted, to refer the subject to a committee consisting of Messrs. PERKINS and GARFIELD, to prepare such a schedule of requirements as should, in their judgment, facilitate the action of societies, and at the same time secure the object of the State in offering its bounties, by eliciting accurate, trustworthy and exact information in regard to the crops entered for premium, and to report the same for the consideration of the Board.

This committee reported subsequently, but as the course suggested was not thought to be calculated to secure the desired end, it was not adopted.

The question then recurred on Dr. Loring's amendments to the blank to be furnished by the societies to competitors for premiums.

Prof. AGASSIZ said there ought to be a more general understanding as to the object of awarding premiums, that is, as to whether they are designed simply to reward farmers for improvements that may have been made, mere rewards of merit, in other words, or to gather some facts and data of value to agriculture. The latter ought to be the aim of the State, and if it is, we cannot be too exacting and minute.

After some further discussion the amendments were adopted, and the form completed as follows:

Agricultural Society.

Statement concerning a crop of
Raised by Mr.
In the town of 1865.

What was the crop of 1863?
What manure was used, and how much?
What was the crop of 1864?
What manure was used, and how much?
What is the nature of the soil?
When, and how many times ploughed, and how deep?
What other preparation for the seed?
Cost of ploughing and other preparation?
Amount of manure, in loads of thirty bushels, and how applied?
Value of manure upon the ground?
When, and how planted, and the amount and kind of seed?
Cost of seed and planting?
How cultivated, and how many times?
Cost of cultivation, including weeding and thinning?
Time and manner of harvesting?
Cost of harvesting, including the storing and husking or threshing?
Amount of straw, stover, or other product?

REMARKS.

Signed by *Competitor.*

From actual measurement, I hereby certify that the land which the above crop of covered, contained rods, and no more.

Acting Surveyor.

I hereby certify that appointed for that purpose by the Committee on crop, appeared before me, and took oath that he has ascertained the weight of the above crop, according to the regulations of the State Board of Agriculture, on the day of and that it was pounds.

Justice of the Peace.

In ascertaining the amount of crop, any vessel may be used, and the weight of its contents once, multiplied by the number of times it is filled by the crop.

The certificate shall state the weight of all crops only in a merchantable state.

In measuring the land, any competent person may be employed, whether a sworn surveyor or not.

In ascertaining the amount of a hay crop, entered for premium, the measurement of the hay in the barn may be employed.

The Committee with whom crops are entered for premium, may, at their option, select such entries as are in their judgment entitled to the application of the above regulations.

Rules of Measure, practised and adopted by the State Board of Agriculture.

Wheat, Potatoes, Sugar Beets, Mangel Wurzel, Ruta-Bagas, White Beans, and Pease,	60 lbs. to the bushel.
Corn, Rye,	56 " "
Oats,	32 " "
Barley, Buckwheat,	48 " "
Cracked Corn, Corn and Rye and other meal, except Oat, and English Turnips,	50 " "
Parsnips,	45 " "
Carrots,	55 " "
Onions,	52 " "

Dr. HARTWELL, of Southbridge, then presented a paper upon ADIPOCERE, as follows:

ADIPOCERE.

A soft, unctuous substance, of a light brown color, into which the muscular fibres of dead bodies are converted, by long immersion in water or spirits, or, by being buried in moist places under peculiar circumstances.

This substance was first discovered by Fourcroy, in the burying-ground in the Church des Inouns, in Paris, in 1787, when it was removed, among the masses of the bodies of the poor there interred together.

In this place, about fifteen hundred bodies were thrown together into the same pit, and being decomposed, were converted into this substance. When this substance is subjected to chemical analysis, a true ammoniacal soap is first yielded, composed of ammonia, or concrete oil and water.

My attention was first called to this substance in the summer of 1861.

One of my farm laborers was scraping the ground in my livery barn cellar, when he uncovered a white substance, which, upon examination, I found to be *adipocere*. It was the remains of a hog which had been buried there many years. The present tenant had occupied the barn for over ten years, but had no knowledge of the burial of the animal. It might have been there thirty years. It must have been there over ten years.

The bones of this hog were in a perfect state of preservation, the hair also was not changed.

The quantity of *adipocere* was quite large, showing that the whole soft parts of the body had been converted into this substance.

The color of this substance was a perfect white.

The yellow tinge is produced by exposure to the air and light.

The specimen which I show you is from one of two cows which belonged to my neighbor, and were killed by eating green clover in August, 1863. I permitted him to bury them in my horse-manure heap, upon my farm, where they have laid to this 5th of December, 1864. The part of the animal which was changed to *adipocere* was in contact with the ground in a kind of pit, deeply covered with compact manure, which excluded the air, and was constantly charged with water.

The carcase of a horse was buried in the same heap of manure in April, 1864, in a higher and drier part of the heap. Nothing remained to be seen of this animal except the bones, hoofs, and hair, all the other parts had been incorporated with the manure.

The time required for the decomposition of animal matter in a warm horse-manure heap, cannot be many days.

No offensive gaseous exhalations, where the covering is two feet, can be discovered.

My principal object in this communication is to call the attention of farmers to the best and most profitable way of disposing of domestic animal bodies, which die of disease or accident.

Almost every country town has its veterinary cemetery, usually selected in some loose, sandy, or gravelly soil, in consequence of its easy excavation. This porous sand will not absorb and retain the gases; hence there are frequent complaints to the selectmen of the town, who are believed to possess legal and sanitary powers sufficient to correct all misdemeanors which may offend the body politic. The difficulty then is to find the man whose olfactories can endure the stench.

The nuisance is usually suffered to exhaust itself while the case is under adjudication.

I once permitted my neighbor to bury his dead horse in my farm gravel-pit. The consequence was that my laborors left the field by reason of the offensive odor from the equine remains. I complained to my friend that he did not cover the dead horse deep enough.

He promised me faithfully that the evil should be corrected. But the difficulty was that he could not find a man to do the sepulchral service. In a few days, the evil, like many diseases by nature's recuperative powers cured itself, and my farming was progressing again in its usual monotonous way.

Now, to save all this trouble and expense, and use these carcases of dead animals to profit, you have only to put them in your dung heap. If you have not a manure heap, just lay the dead animal upon your pasture, and over it dump one or two cords of manure, and your obsequies are scientifically performed.

This manure will absorb all the elementary substances emanating from decomposition of the animal remains. How much this animal matter will add in nitrogen to the value of the manure, I am not, from chemical experiments, able at this time to inform you.

Some of the manure which I am putting upon my farm is impregnated with this animal matter.

I am making arrangements to analyze this manure according to the best farming method.

In making the chemical analysis, I lay the works of Sir Humphrey Davy, Dr. Dana, Liebig and Boussingault, upon the shelf, and proceed with my experiments in the most practical way. I shall not be able to give the equivalents of oxygen, nitrogen, hydrogen, and carbon contained in this manure.

My scientific analysis will consist in staking off a given number of rods of land upon which this manure has been applied, and then staking off an equal number of rods upon which an equal quantity of the same kind of manure not thus impregnated with animal matter will be applied. Both lots of land are to be planted with Indian corn.

This Indian corn, in the language of chemistry, is to be my re-agent.

My *test* is to be the sealed half bushel measure; the difference in productiveness of the lots is to be noted as the *finale*.

Voted, that the thanks of the Board be presented to Dr. Hartwell, and that the paper be published in the Report.

MONDAY, Jan. 30th.

The subject under consideration on Monday, January 30th, was the Agricultural College. This subject was introduced by the report of the committee to which certain resolutions offered at the public meeting at Greenfield had been referred.

After a very full and free expression of opinion on the part of the members from all parts of the State, the following preamble and resolutions were adopted as the sense of the Board:

Whereas, it appears by the message of his excellency, the governor, and by the report of the trustees of the Agricultural College, that that institution has been located in the town of Amherst, strictly in accordance with the provisions of the law, in that case made and provided, and that a farm has been purchased, which, with its surroundings, is, in the judgment of the trustees, eminently fitted for the purposes of the institution, and deeds of warranty taken in the name of the corporation, Therefore

Resolved, That no action by the Board of Agriculture, on the subject of location, is necessary or desirable.

Resolved, That the Agricultural College should maintain an intimate relation to the agricultural societies and the farmers of the Commonwealth, as a means of disseminating practical information and affording the best means of educating young men for the business of farming.

Resolved, That for this purpose every effort should be made to connect the State Board of Agriculture, in some way, with the government of the college, for the express object of bringing the agricultural societies into close connection with that institution; and as the most useful method of combining all the efforts of the Commonwealth in one system of practical agricultural education.

TUESDAY, Jan. 31st.

On Tuesday, the Board, by special invitation of Professor Agassiz, held its meeting at the Museum of Comparative Zoölogy, at Cambridge. The origin and objects of the institution were explained by the Professor and his assistants. After some hours devoted to viewing the magnificent collections of natural history and the working facilities which the Museum affords, the Board, by invitation of the Massachusetts Society for Promoting Agriculture, visited the Bussey Farm, at West Roxbury, to examine the Norman horses, imported by that society, during the last year, from France. Respecting the history and characteristics of the horses, Mr. Saltonstall, on behalf the Massachusetts Society for Promoting Agriculture, presented the following statement.

THE PERCHERON HORSE.

The trustees of the Massachusetts Society for Promoting Agriculture, feeling that a great want of the farmers exists in the matter of a proper horse for agricultural purposes,—a horse uniting the qualities of great strength with reasonable speed,—after husbanding their means for several years, have imported two noble stallions and three fine mares, of the famous Percheron breed. This horse, undoubtedly, is the best representative of a true agricultural horse in the world. And the horses of the society are splendid types of their breed.

Herbert says,* "Le Perche is a district of that portion of France which was formerly known as Normandy, in which the breed of the Norman horses has been most highly cultivated, and exists in its most perfect form and improved condition. The remarkable purity of the race is attested by the certainty with which the stallions transmit to their progeny, begotten on mares of a different race, their own characteristics, and the high degree in which the offspring of the mares, bred to horses of superior class, retain the better qualities of their dams."

The Percheron horse is a cross of the old Norman war-horse, of the iron-clad chivalry of the Middle Ages,—of William the Conqueror and Richard Cœur de Lion,—with the light Andalusian horse, which in its highest form was a pure barb of Morocco imported into Spain by the Saracen Moors.

"The bone and muscle, and much of the form of the Percheron come from the old Norman war-horse; and he gets his spirit and action from the Andalusian. Docility comes from both sides. On the expulsion of the Spaniards from the Northern Provinces, the supply of Arabian stallions was cut off, and, since that time, in the Perche district of Normandy, their progeny has, doubtless, been bred in-and-in; hence the remarkable uniformity of the breed, and their disposition to impart their form to their progeny, beyond any breed of domestic animals within my knowledge. Another circumstance, which, I think, has tended to perpetuate the good qualities of these horses, is the fact of their males being kept entire; a gelding is, I believe, unknown among the rural horses of France. The farmer will thus breed from the best horse, and he will have an opportunity of judging, because he has been broken to harness and his qualities known before he could command business as a stallion."

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* Hints to Horse Keepers. Chapter 5.

The points of the peculiar breed known as the Percheron-Normans are these: Their standard is probably from fifteen to sixteen and a half hands. "They are very short in the saddle place, and comparatively long below; they are well ribbed up and round-barreled; they have not the heavy head and extremely short, thick neck of the old Norman horse; but, on the contrary, have the head short, with the genuine Arabian breadth of brow and hollow of the profile between the eyes and nostrils; nor are the heads thicker, especially at the setting-on place, nor the necks, which are well arched and sufficiently long, heavier or more massive than corresponds well with the general stoutness of their frame. Their legs are particularly short from the knees and hocks downward; nor, though heavily haired, have they such shaggy fetlocks and feet as the larger Normans, while they have the unyielding, iron-like muscles and feet, apparently unconscious of disease, for which the latter race are famous."

Herbert concludes his chapter on the Norman horse by quoting from a writer in the "British Quarterly Journal of Agriculture:" "The horses of Normandy are a capital race for hard work and scanty fare. I have never seen such horses at the collar, under the diligence, the post-carriage, the cumbrous and heavy boiture or cabriolet for one or two horses, or the farm-cart. They are enduring and energetic beyond description; with their necks cut to the bone, they flinch not; they keep their condition where other horses would die of neglect and hard treatment. A better cross for some of our horses cannot be imagined than those of Normandy, provided they have not the ordinary failing of too much length from the hock downward, and a heavy head." "These two points last named," (Herbert goes on to say,) "are precisely those which are entirely got rid of in the best style of Percheron-Normans, which are, as has been stated, those of the Normans most thoroughly imbued with the Arabian, or, to speak more correctly, Barb blood of Andalusia."

Such, then, are the horses imported by the trustees of the Massachusetts Society, with the hope that the farmers of Massachusetts will avail themselves of the opportunity offered them of crossing their best mares with this renowned stock, and thus obtain an animal uniting more of the qualities essential to them in their agricultural pursuits than can be now found in any State in the Union—a horse which will probably more nearly resemble the Morgan in his best days than now exists.

WEDNESDAY, Feb. 1.

The Board met at 10 o'clock according to adjournment.

Present, Messrs. Adams, Agassiz, Bull, Clement, Garfield, Grout, Homer, Hubbard, Huntington, Johnson, Keith, Kenrick, Loring, Moore, Perkins, Saltonstall, Matthew Smith, J. M. Smith, Stedman, Stockbridge, Thompson and Tidd.

Mr. Grout in the Chair.

Messrs. Tidd, Stockbridge and Adams, having been appointed a committee on credentials of new members, reported that the following members were duly elected, viz.:

Leverett Saltonstall, of Newton, by the Massachusetts Society for Promoting Agriculture.
Asa Clement, of Dracut, by the Middlesex North.
Newton S. Hubbard, of Brimfield, by the Worcester South.
Velorous Taft, of Upton, by the Worcester South-East.
Levi Stockbridge, of Hadley, by the Hampshire.
John M. Smith, of Sunderland, by the Franklin.
John Kenrick, of Orleans, by the Barnstable.
Daniel A. Cleaveland, by the Martha's Vineyard Society.

On motion of Mr. Huntington it was

Resolved, That the Board of Agriculture petition the legislature for such alteration of the 4th section chapter 66 of the General Statutes relating to Fairs, as shall enable the several original county societies to award premiums without reference to other societies that have been formed within their limits.

The Board then proceeded to assign the delegates to visit and report upon the Exhibitions of the county agricultural societies for the year, as follows: To the

Essex,	Asa Clement.
Middlesex, at Concord,	T. G. Huntington.
Middlesex North, at Lowell,	Charles O. Perkins.
Middlesex South, at Framingham,	Abel F. Adams.
Worcester, at Worcester,	Matthew Smith.
Worcester West, at Barre,	Louis Agassiz.
Worcester North, at Fitchburg,	N. S. Hubbard.
Worcester South, at Sturbridge,	J. M. Smith.
Worcester South-East, at Milford,	John Kenrick.
Hamp., Franklin and Hampden, at Northampton.	James Thompson.
Highland, at Middlefield,	Hollis Tidd.
Hampshire, at Amherst,	Leverett Saltonstall.
Hampden, at Springfield,	E. W. Bull.
Hampden East, at Palmer,	George B. Loring.
Franklin, at Greenfield,	Elias Grout.
Berkshire, at Pittsfield,	Levi Stockbridge.
Hoosac Valley, at North Adams,	Henry R. Keith.
Housatonic, at Great Barrington,	Phineas Stedman.
Norfolk, at Dedham,	Sylvander Johnson.
Bristol, at Taunton,	Velorous Taft.
Plymouth, at Bridgewater,	Daniel A. Cleaveland.
Barnstable, at Barnstable,	Harrison Garfield.
Nantucket, at Nantucket,	John B. Moore.
Martha's Vineyard, at West Tisbury,	Alured Homer.

Thursday, Feb. 2.

The Board met according to adjournment, when Mr. Tidd was requested to preside.

The first business in order was the consideration of the report of the committee on a list of subjects submitted by Mr. Bull, chairman, when the following committees were appointed:

On Cranberries.—Messrs. Kenrick, Davis, and Thompson.

The Grass Crop.—Messrs. Stockbridge, J. M. Smith, and Homer.

Grape Culture.—Messrs. Bull, Clement and Moore.

The Dairy.—Messrs. Keith, Tidd, Huntington, and Hubbard.

Fruit Culture.—Messrs. Thompson, Clement, and Bull.

Farm Fences.—Messrs. Grout, Adams, and Johnson.

Making and Application of Manures.—Messrs. Perkins, Stedman, and Homer.

Farm Accounts.—Messrs. Garfield, Stedman, and Perkins.

Fecundation, Gestation, and Parturition of Domestic Animals.—Messrs. Agassiz, Loring, and Matthew Smith.

Farming as an Occupation.—Messrs. Moore, Huntington, and Adams.

Management of Woodlands and Forest Trees.—Messrs. Clement, Taft, and Kenrick.

Sheep Husbandry.—Messrs. Loring, Keith, and Matthew Smith.

Adaptation of Crops to Soils, &c.—Messrs. Stedman, J. M. Smith, and Grout.

Raising and Preservation of Seeds.—Messrs. Huntington, Stedman, and Hubbard.

Drainage.—Messrs. Saltonstall, Perkins, and Clement.

Committee on Meetings.—Messrs. Loring, Agassiz, and Keith.

Voted, To appoint a committee of three to take action upon the resolutions relating to the agricultural college—Messrs. Loring, Bull, and Perkins.

It was voted, that the public meeting for lectures and discussions be held at Worcester, on Tuesday, the 12th of December.

Adjourned.

In accordance with a vote of the Board, the following was presented as the Report of the Committee on

GRAPE CULTURE.

BY E. W. BULL.

The past season has been peculiarly favorable to the grape, and many of the tender and uncertain varieties have been ripened much better than usual. These circumstances are likely to add to the interest now so largely felt by the public in grape culture, and to quicken the purpose which many entertain of planting vineyards; your committee propose, therefore, to notice the, in their judgment, best methods of planting, and the necessity of certain precautions to secure success. Perhaps nothing has so much prevented the planting of vineyards as the belief in trenching, and other costly modes of culture, derived from the practice of vine-growers in other countries, and the teaching of the books on which we have too much relied in the absence of experience of our own.

We believe that trenching is not only unnecessary—except, perhaps, for the purpose of draining wet lands—but really injurious to the vine, the roots of which are thus invited into the cold subsoil, which, in our short seasons does not get warm enough to promote the healthy development of the vine, which grows late, and is thus surprised by the winter with unripened wood, which yields imperfect and unripened buds, to give imperfect and late fruit the ensuing season, if, indeed, it does not die outright.

Trenching, in hot countries, saves the vine from the effects of the severe droughts which prevail during their long and hot summers, and is, in such localities, indispensable to success; but the fact that trenching varies *according to the climate*, being, in France, about twenty inches, in Spain, about thirty inches, and in Italy four and sometimes five feet, shows that we must adapt our culture to the conditions of climate, and our experience leads us to the conclusion that twelve inches is quite enough.

One other difficulty lies in the way of the cultivation of the grape—in the the large way,—and that is the almost universal belief that protection is necessary to carry the vines,—even those called hardy, safely through the winter.

Your Committee have, in former reports, invited attention to the misuse of this term, which should only be applied to such grapes as are absolutely hardy—*without protection*—under all ordinary circumstances. It is quite common among grape-growers to call any grape hardy which can be made to survive the winter with aid of protection, but we believe that the term applies properly only to those, which, like the apple, pear, &c., survive all winters without protection, except unusually severe and exceptional ones, against which no experience can shield you.

We have such grapes, and it is the part of wisdom, at least on the part of the novice, to begin with such as have been proved to be adapted to field culture without protection.

THE SOIL

which is best adapted for a vineyard, is light and warm, such as would carry a firstrate crop of corn. It should not be so level that water would stand about the roots in winter, and it should be in good heart, but not excessively rich. Indian corn is a good preparatory crop, insuring clean tillage and destruction of all weeds and grass. If, however, the soil be stiff and inclined to clay, and *if it be dry*, with a slope toward the sun, it may be made to carry grapes by adding to it liberal dressings of vegetable mould, with ashes, plaster, and bone-dust. Such soil should be ploughed very deep to insure good drainage and permeability to warm rains and to the tender roots of the plants. It will, however, never be so good for the grape as the warm loam which we recommend above.

Wet, spongy, and cold soils are wholly unfit for the grape, and can only be improved by deep trenching and thorough draining with tiles or stone; but be careful, in such cases, to leave the manure *near the surface* that the roots may thus be kept within the influence of the summer heat, so that the wood will be well ripened, and the buds made into fruit-buds for the next year's crop. With all these precautions, however, such soil will not give you grapes of the finest quality, unless, indeed, the situation is especially favorable.

PLANTING THE GRAPE.

Having ploughed the field as deep as possible, say from nine to twelve inches, carry on about forty loads of compost, made of peat mud, or vegetable mould and barnyard manure, made the season before, and well fermented. Spread on the surface, and cross-plough six inches deep. Mark out your rows ten feet apart, let them run north and south, if possible, and plant the vines six feet apart in the rows. This gives you sixty square feet to each vine, and seven hundred and twenty-six vines to the acre. These distances will enable you to plough and cultivate between the rows, and to go with the cart to carry off the crop. The sun will also reach the earth, and warm it to a greater depth than would happen in closer planting, and your vines will keep in better health, and will give you abundant crops.

Take care to spread out the roots of the vine in every direction, covering them six inches with the soil, and leaving the ends of the roots a little deeper than the crown of the plant. Press the earth rather firmly to the roots, keep down all weeds, and stir the earth frequently. A light root crop may be taken from the middle of the rows the first season to lighten the expenses of cultivation.

To avoid unnecessary repetition in the matter of pruning, &c., &c., we would refer to the article on grape culture, p. 64 of this volume.

COST OF VINEYARDS.

There is not the least need of the extravagant expense so often incurred in planting vineyards. We have shown that it is unnecessary to trench and heavily manure the soil—both costly processes—and now proceed to show the cost of establishing an acre of vineyard. If planted at the distances we recommend, there will be, to the acre—

726 vines, which, at $25 per 100, . .	$181 50
40 loads compost, at $1 per load, . .	40 00
Ploughing, ...	6 00
Carting and cross-ploughing, . . .	3 00
726 poles, at 1c., ...	7 26
Planting—two men, ten days, . . .	30 00
Total cost of planting an acre, . .	$267 76

There will be some difference in the cost in various localities, but it is believed the above statement is a fair average.

The cost of planting an acre on the Ohio, is said to be about three hundred dollars after *trenching*, which we avoid; on the other hand, the cost of labor and manure is in their favor.

The third year after planting, the first crop may be gathered. Five pounds to the vine will be a light crop if the vines have had proper culture, say thirty-five hundred pounds to the acre, which, at ten cents per pound, will amount to three hundred and fifty dollars. The next year twice this crop may be safely taken, the next year three times, and the next year four times the weight of the first crop, or more than seven tons to the acre, worth, at ten cents the pound, fourteen hundred dollars. If we deduct one-half, even—although we know these figures have been exceeded for three successive seasons,—we still have an annual income of seven hundred dollars from an acre of vines, an income which would cover the expense of even extravagant culture, and still give larger profits than any other crop we raise.

To this we only add that the grape-harvest does not take from the labors of the farm the strong hands wanted for other harvests, but may be gathered by old and young, invalids even, who, jocund and glad, make of it sport rather than labor.

ERRORS IN PROPAGATION.

In this direction, perhaps, lies the most danger to our coming vineyards; for vines propagated from feeble or unripe wood, or even from ripe wood, if from single buds, in heat, under glass, will not be so strong nor so hardy of constitution as those raised in the open air from strong cuttings. This is simple common sense. We do not breed from weak animals, still less from those too young. Does the grafter take his scions from trees which are weak, or the farmer his seeds from weak plants?

Does not the first, rather, go long distances to obtain, from the best and most vigorous trees, the best scions which they bear? and the farmer, also, from his neighbor's well-ripened seeds from strong plants, if all his own are weak? Certainly, this is the practice of ages; the ancients were not content with less than the best and most fertile cuttings from the best and most productive vines.

They selected even those cuttings which ripened their fruit the earliest; and they maintained that the early maturity of the fruit was advanced by this means, and its culture thus made possible in less favorable localities; and they were unquestionably right, for the practice prevails down to this day.

Now, if from vines which *abound in field culture*, they select only the best and earliest wood, and find it *necessary* to do so, even in their fine climate so suited to the grape, how much more important must it be for us, in our rough climate and changeful seasons, to propagate only from the most vigorous wood, as well as the most early. A single week will often make the whole difference between getting your crop ripe or losing it, and the extreme difference, in time of ripening the crop, between the feeble vine from the hot-house and the strong one from the nursery-bed, will be two weeks. The difference between the average of vines from the nursery, even, will be in the same vineyard row, sometimes in time one week, and, in amount of crop one-third. The *best* vines, then, will give crops which will vary both in quantity and season; how unwise it must be, then, to accept those which are not only not the best, but are positively the worst and feeblest.

Propagators say, indeed, that any natural feebleness in these weak cuttings is overcome by the skill of the cultivator and the stimulus of long-continued heat, and the longer season,—winter in the hot-house and the open ground in summer,—which they have to grow in; but we believe that vines weakened by this excessive propagation, do never attain their *proper* vigor, and we know of some, which, after five years' cultivation, have not yet shown fruit, although carefully nursed. In no other way can we account for the discrepancy in the statements in regard to some of our new grapes; some growing strong, while others of the same kind do hardly grow at all, as has happened in our experience. It is not uncommon for propagators, who want to get up a stock of some new grape at the earliest possible moment, to layer the *growing* wood of the young vine,—itself from a single bud,—and to get, from every eye of this green and growing wood, with aid of heat and moisture, a new vine. Now nature lays up, in the internodes or spaces between the buds of the grape, organizable matter to feed the bud in the spring when it first begins to grow. This organizable matter feeds in the same way the bud which grows from the cutting, and the stronger the cutting, the more vigorous will be the growing shoot and the roots which are formed from its base, and those which grow from the lower buds, so we get two or three systems of roots from the two or three buds which the cutting contains; the top grows with vigor, the wood gets its development early in the season, ripens perfectly, and, when planted out, the vine grows with vigor and comes up to its proper type and the normal condition of the kind to which it belongs.

Our seasons are so short and so variable that, though we have demonstrated the practicability of grape culture in the open field, without protection, it will be wise, and probably necessary, in the long run, to plant only the strongest and best, and, where it is not possible to get strong and good vines, to confine our culture to the garden and the few, until we are able to obtain such better plants as can be grown in the field. But not only should the young vines be grown from the most early and prolific vines, they should be grown in soil as nearly as possible like that of the vineyard into which you are going to transplant them; for if the soil of the nursery-bed is moist and rich, and the soil of the vineyard dry and not rich, then will the young vine be pinched in its growth, and, as all cultivators know, may take on a starved habit which it will not get rid of for years. It would be safer to get your vines out of a soil not quite so good as your vineyard, or at least, not better, and if the soil of your vineyard is strong and inclined to clay, get your vines, if possible, out of similar soil, for *if they have thriven in such soil*, they will continue to thrive in soil of the same nature. One must remember that such soils require continual stirring to keep them friable, and that such soils, more than all others, are amended by composts to which lime is added rather freely.

We believe that if strong and healthy vines, which are perfectly hardy and of free growth, are planted in the vineyard, success will follow the method we have recommended.

Slender growing vines and those of tender constitution require higher feeding and protection in winter, but the cultivation of even these, some of them, will become possible with increased skill and experience. We recommend, however, to the novice, only those hardy and free-growing kinds which are sure of success without much of either.

THE STATE CABINET.

The State Cabinet of Natural History has received many additions since my last Report. A rapidly increasing interest in its objects and aim is manifest, not only in the frequent contributions to its instructive collection of specimens, but also in the greater influx of visitors, and the preponderance of that class who are eager to inform their minds, and not merely to spend a leisure hour in the vacant contemplation of a number of "curiosities." Grateful acknowledgments for various donations in the department of Entomology, during the past year, are due to the following individuals: —

Messrs. William H. Floyd, of Weston; John C. Moore, of Boston; Wm. E. Rice, M. D., of South Boston; Henry A. Purdie, of Boston; E. H. & F. Goss, of Melrose; Caleb Eames, of Wilmington; J. W. Manning, of Reading; John Osgood, of Lynn; Thos. F. Dickinson, of Walpole; Louis H. Samuels, of Boston; Horace J. Foster, of Quincy; Mrs. H. W. Wellington, of W. Roxbury; Miss C. E. Guild, of Walpole; Amory L. Babcock, of Sherborn.

In other departments donations have been received as follows:

MAMMALOGY.

Forster's Shrew. *Sorex forsteri.* (Richardson.) Donor, E. S. WHEELER.

Short-tailed Shrew. *Blarina talpoides.* (Gray.) Donor, H. M. NELSON.

Albino Rat. *Mus decumanus.* (Linn.) Donor, M. SANDS.

Albino Rat. *Mus decumanus.* (Linn.) Donor, W. W. DOVE.

Meadow Mouse. *Arvicola riparia.* (Ord.) Donor, J. L. PRATT.

Tooth of Whale. T. S. BRIGHAM.

ORNITHOLOGY.

Quail. *Ortyx virginianus.* (Bon.) Female. Donor, E. A. SAMUELS.

Red-breasted Snipe. *Macrorhamphus griseus.* (Leach.) Donor, JOHN OSGOOD.

Purple Sandpiper. *Tringa maritima.* (Brun.) Male. Donor T. C. HASKELL.

Ten skins of Massachusetts birds, duplicates of specimens already in the cabinet. Donor, A. L. BABCOCK.

OOLOGY.

One egg of Belted Kingfisher. *Ceryle alcyon.* (Boie.) Donor, E. A. SAMUELS.

Two eggs of Great-crested Flycatcher. *Myiarchus crinitus.* (Cab.) Donor, E. A. SAMUELS.

Four eggs of White-bellied Swallow. *Hirundo bicolor.* (Vieillot.) Donor, E. A. SAMUELS.

Three eggs of House Wren. *Troglodytes ædon.* (Vieill.) Donor, E. A. SAMUELS.

One egg of Long-billed Marsh Wren. *Cistothorus palustris.* (Cab.) Donor, E. A. Samuels.

Two eggs of Black-capped Titmouse. *Parus atricapillus.* (Linn.) Donor, E. A. Samuels.

One egg of Indigo Bird. *Cyanospiza cyanea.* (Baird.) Donor, E. A. Samuels.

Two eggs of Common Crow. *Corvus americanus.* (Aud.) Donor, George A. Hall.

Two eggs of American Bittern. *Botaurus lentiginosus.* (Steph.) Donor, E. A. Samuels.

One egg of Green Heron. *Butorides virescens.* (Bon.) Donor, E. A. Samuels.

One egg of Clapper Rail. *Rallus crepitans.* (Gm.) Donor, E. A. Samuels.

One egg of Virginia Rail. *Rallus virginianus.* (Linn.) Donor, E. A. Samuels.

One egg of Summer Duck. *Aix Sponsa.* (Boie.) Donor, E. A. Samuels.

One egg of Arctic Tern. *Sterna macroura.* (Naum.) Donor, E. A. Samuels.

One egg of Least Tern. *Sterna frenata.* (Gambel.) Donor, E. A. Samuels.

Of the eggs of domestic poultry, the following donations have been made:

One egg of Game Fowl; Cochin China Fowl; Dorking Fowl; Creeper Fowl; and Domestic Duck. Donated by E. A. Samuels.

Two eggs of Leghorn Fowl. Donated by M. M. Tidd.

Seven small eggs of Common Fowl. Donated by F. B. Chadwick; also, one egg of Guinea Fowl, and one of China Goose, by same.

Two eggs of African Bantam. Donated by E. Burgess.

One distorted egg of Common Fowl. Donated by J. H. Jenks.

One egg of Bronze Turkey. Donated by J. L. Pratt.

ICHTHYOLOGY.

The Museum of Comparative Zoölogy donated the following species in this department:

One specimen of Perch. *Perca flavescens.* Cuvier.

Two specimens of Cunner or Sea Perch. *Ctenolabrus burgall.* Cuv.

Three specimens of White Perch. *Merone americana.* Gill.

Two specimens of Bream or Pond Fish. *Pomotis auritus.* Raf.

One specimen of Sculpin. *Cottus grœnlandicus.* Cuv.

One specimen of Slender Sculpin. *Cottus octodecimspinosus.* Mitch.

Three specimens of ten-spined Stickleback. *Pygasteus dekayi.* Brevoort.

Three specimens of two-spined Stickleback. *Gasterosteus biaculeatus.* Mitchell.

Two specimens of Dollar Fish. *Peprilus triacantha.* Cuvier.

One specimen of Eel Pout. *Zoarces anguillaris.* Storer.

One specimen of Horned Pout. *Pimelodus atrarius.* De Kay.

Two specimens of Chub. *Semotilus argenteus.* Putnam.

One specimen of Sucker. *Catostomus bostoniensis.* Les.

Two specimens of Shiner. *Plargyrus americanus.* Girard.

Four specimens of Red Fin. *Hypsalepis cornutus.* Agassiz.

Four specimens of Striped Minnow. *Hydrargyra majalis.* C. & V.

Three specimens of Minnow. *Fundulus pisculentus.* C. & V.

Three specimens of Minnow. *Fundulus multifasciatus.* C. & V.

One specimen of Hardhead. *Alosa menhaden.* Storer.

One specimen of American Turbot. *Platessa oblonga.* De Kay.

One specimen of Spotted Flounder. *Pleuronectes maculatus.* Mitchell.

One specimen of American Sole. *Achirus mollis.* Cuvier.

One specimen of Flounder. *Platessa plana.* Storer.

One specimen of Common Eel. *Anguilla bostoniensis.* Leseur.

One specimen of Dog Fish, (factus.) *Acanthias americanus.* Storer.

One specimen of Sand Launce. *Ammodytes americanus.* De Kay.

One specimen of Lamprey. *Petromyzon americanus.* Leseur.

HERPETOLOGY.

One specimen of Spotted Tortoise. *Emys guttata.* Storer. Donor, G. T. Brown.

THE AGRICULTURAL LIBRARY.

The State agricultural library connected with the office of the Secretary of the Board, has received but few accessions during the past year, there having been no appropriation from which new additions could be procured. It is desirable that this valuable collection of books, the most extensive, at the present time, of any of a similar character in New England, should be kept up with the times, and every effort will be made to procure such additions, from time to time, as the means at command make practicable.

It is more generally used for reference than ever before, especially during the sessions of the legislature, and it is important that some permanent fund should be provided by which the new publications should be procured as they appear.

THE AGRICULTURAL COLLEGE.

Some progress has been made, since my last Annual Report, in the establishment of an agricultural college under the Act of Congress of July 2d, 1862. The Act of the legislature creating a board of trustees, practically limited them in the choice of a location, to those places which should raise by subscription, or otherwise, the sum of seventy-five thousand dollars for building purposes. Under this condition, but four towns came forward, and, with great public spirit and liberality, offered that amount, either in the form of a *bona fide* subscription, or of a guarantee that they would comply with the condition imposed by law. These places were Lexington, Springfield, Northampton, and Amherst.

The trustees, after examining several locations with great care and solicitude, came to a nearly unanimous decision to locate the college in the town of Amherst, chiefly on the ground that the farm lands, presented for their consideration, were better adapted for the objects in view than those offered elsewhere. The lands, consisting of about four hundred acres, were accordingly purchased, and the preliminary steps taken for the establishment of the college. This location was approved, after examination, by the governor and council.

Whatever may be said of the action of the trustees in regard to the matter of location, it is probable that any impartial body of men, appointed as agents of the State to act under similar circumstances, with all the information necessary to a decision placed in their possession, would have come to the same conclusion. If there is any reasonable ground of complaint, therefore, in regard to the question of location, it can hardly be made against the action of the trustees. They did what they thought to be for the best interests of the State and the institution, so far as it was in their power under the law.

It is to be hoped, therefore, that there will be a general acquiescence in the decision, and that the agricultural community will coöperate with the trustees in establishing an industrial college, which shall be an honor alike to the Commonwealth and the country at large.

It is designed to establish an independent institution, without any direct connection with Amherst, or any other college, in accordance with what appeared to be the direction of public sentiment. Arrangements will soon be made to proceed with the erection of suitable buildings, but it must, in the nature of things, be some time before the college can be put into a condition to receive students. Of the aggregate fund, consisting of scrip for three hundred and sixty thousand acres of the public lands, one-tenth of which, or thirty-six thousand acres only could be appropriated to the purchase of lands, three-tenths were placed under the control of the Massachusetts Institute of Technology, leaving but two hundred and sixteen thousand acres to be sold to constitute a permanent working fund. Only a part of this has been sold as yet, and that at an average price of only about eighty cents an acre. Some time will be required to realize the whole amount.

In the meantime the lands at Amherst, purchased by the trustees, have been leased to the former owners at an average of about five per cent. a year on the purchase money, or about five dollars an acre rent, including woodlands, waste and tillage, and under reasonable restrictions as to crops, manure, stock, &c. This temporary arrangement appeared to be for the interest of all concerned, and it would seem to indicate, at least, that the purchase was a judicious one on the part of the college, so far as the rent may be taken as a criterion of the value of the land.

The trustees have elected the Hon. Henry F. French, a gentleman well known to the farming community, as the president of the College, and under his energetic supervision, aided by a competent executive committee of the board of trustees, the work will be forwarded as fast as practicable.

During the year, also, the New England Agricultural Society, which originated in the action of the State Board of Agriculture, at its annual meeting in 1864, has been formed, and has held its first great exhibition in the city of Springfield. This exhibition was a grand success so far as it illustrated the agricultural enterprise of this and sister States, and formed a marked feature in the public displays of the year. The immense crowds that attended it, as well as the attendance on most of the county fairs, gave evidence of increasing activity and interest in the community.

We have now throughout the country a pretty complete system of agencies for the promotion of progress in agriculture, from the Department of Agriculture at Washington, to the State societies and organizations, and the county societies, to say nothing of farmers' clubs and other town and local associations. It remains for the great body of intelligent farmers to avail themselves of such efforts and such instrumentalities, as the means of advancement in their calling, and the attainment of the highest degree of perfection, in the development of the agricultural resources of the country.

CHARLES L. FLINT,
Secretary of the State Board of Agriculture.

BOSTON, January 25, 1865.

APPENDIX.

REPORTS OF DELEGATES

APPOINTED TO VISIT THE

AGRICULTURAL EXHIBITIONS.

ESSEX.

The forty-seventh annual exhibition of the Essex County Agricultural Society, was held at Lawrence the 27th and 28th of September. Being a native of Essex County, and my father having been one of the presidents of the society, I hoped to have derived much pleasure from the duty assigned me; nor do I believe that my expectations would have been disappointed had I not been prevented from repeating my visit the second day by a painful accident on my way thither. This deprived me of witnessing ploughing matches and other matters of essential interest.

The business meeting held in the city hall was marked by a full attendance and by the interest shown in the questions discussed.

The display in the cattle pens was decidedly small and inferior in quality. A few Ayrshires, and one Durham cow, thirteen years old, which had produced 10,449 pounds of milk from February to September, were noticeable exceptions.

Only three our four lots of sheep were on the ground, all of which, except one pen, were Merinos.

Very few entries were made of horses, and none were noteworthy.

Of poultry there was but a small show, mostly of the *Brahma Pootra* breed, claimed to be the best of the large varieties, but not comparing with our best native and game breeds either in beauty or quality.

In the large tent of the society were a few agricultural implements, carriages, &c., but nothing to challenge admiration or even curiosity.

The display of fruits, vegetables and flowers was very beautiful, and I cannot attempt to describe the effect of the hall as it appeared, its tables loaded with the finest varieties of apples, pears, grapes, and melons, as well as of squashes, cabbages, beets, mangolds, ruta-bagas, carrots, parsnips, and potatoes; with clusters of golden corn and the products of the dairy, adorned, too, with a profusion of beautiful fabrics from the various mills in Lawrence,—a picture of abundance, typical of the industry and thrift of our people. Here seemed chiefly to centre the zeal and interest of the society; while the pens in the market-place or public square were, on that first day, left to crowds of boys, organ-grinders, auctioneers with very loud voices, and jugglers with extremely large drums.

Ought this to be in Essex County? With some of the best farmers and finest farms, in one of the wealthiest counties, with no rival society, the Essex Society should make the effort to excel; and I cannot but think the first step toward this end should be the establishing for itself of an abiding place in some accessible part of the county. This seems to be the great desideratum of the society.

Leverett Saltonstall.

MIDDLESEX.

The annual exhibition of the Middlesex Agricultural Society was held at Concord, on the twenty-second day of September.

This was the seventy-second anniversary of the society. It was natural, therefore, to suppose that the force of long existing ties and familiar associations would bring together a large concourse of people heartily interested in the purposes and transactions of the day. The society embraces within its limits many of the most productive farms and beautiful rural residences—homes of wealth and of taste—in this section of the Commonwealth. One might reasonably anticipate, therefore, a display of animals of every class,—the best of their species,—and of field, orchard, vineyard, and garden products, of surpassing excellence. There would be, also, in such a locality, the finest specimens of various manufactures; and the handiwork of thrifty housewives would add much to the attractiveness of the show.

But our expectations were, in several respects, disappointed. Neither at the field where the ploughing match was held, nor upon the society's grounds for the display of stock, including the hall for the exhibition of fruits, vegetables and domestic manufactures,—places unfortunately wide apart,—was there any large concourse of really interested spectators. There were, indeed, lookers-on, but it did not appear that many of those present, at either point, felt any personal interest in the character or result of the transactions of the day. And, more than once, did the thought occur to our mind, that a lack of warm interest was apparent, which might be supposed to indicate, if it did not proceed from, the chill and decay of age.

Of the officers of the society, we take pleasure in saying that nothing appeared to be wanting on their part, to render the occasion alike pleasant and instructive to all present. All preliminary arrangements had been judiciously made, and every part of the day's programme was punctually attended to at the appointed hour; and perfect order and decorum were preserved throughout. All the features of an agricultural exhibition, common at the present day, were seen in this—excepting a display of farming tools—which we consider an omission anywhere; and excepting, also, those inticements to gambling and intemperance, and those displays of buffoonery, which, if any where allowed, are a disgrace.

The ploughing match was a fair exhibition of the farmer's skill and judgment in handling both the implement and the team. The competition in the work was limited, we apprehend, to the neighborhood,—as is too often the case elsewhere,—and to those farmers who usually enter into it. In ploughing, which is one of the most important parts of farm work, we think it judicious to enlist, in some way—by sufficient premiums, or otherwise—a large number of competitors from various parts of the society's limits, and with the use of ploughs of different construction. The advantage of any particular implement, or of any improved method of operation, might then be perceived and availed of by the farmers present. Ploughing, once the most exciting and closely observed part of an agricultural exhibition, seems to have become one of minor consideration. This, if a fact, is to be regretted, for it is on the plough—the form of the implement itself, and the ease and thoroughness of the operation of it—that much of the facility and success of farm work depends.

In the various departments of animals, the exhibition was not superior, if equal, to many shows of former years. The cattle, however, embraced not merely what are termed "fancy stock," but animals of substantial value and use in the localities and for the purposes of their individual owners. And we consider this a fact of importance to the society, and of credit to the exhibitors of the stock. An imported bull or cow, of pure blood, that has always been fed and handled in accordance with its estimated cost and value, may attract and deserve attention for its singular beauty, or as a promising foundation of an improved race. But farmers who cannot ordinarily incur the expense attending the purchase and keeping of such animals, take pride in exhibiting good stock raised upon their own farms, or otherwise obtained in the exercise of their own judgment, and kept for uses which prove it to be a source of profit. It may be that such animals have no famous pedigree, or beauty of form or color to recommend them; but, as "the tree is known by its fruit," so are they known by, and kept for, their fruit alone. We were pleased, therefore, to see many animals of various grades, and some called only "native stock," as well as to observe the beautiful herds of Dutch, Devon, Jersey, and Ayrshire, both of pure blood and high grades, which were particularly deserving of notice; and, as a whole, rarely, if ever to be surpassed. The cattle of Dutch breed were exhibited by W. W. Chenery, Esq.,—president of the society,—a gentleman whose name has been familiarly associated with the cattle disease, or "Pleuro-pneumonia," the prevalence of which has wrought so much injury to individuals and expense to the State, and caused great disappointment and loss to himself. The animals now on exhibition by him were entirely free from disease, and attracted much attention. The same gentleman also contributed largely to the exhibition by the display of several very beautiful Angora goats and Texel sheep. And in various ways, his means and his efforts seem to be generously employed to promote improvement in every branch of the art which now shares so much of his regard.

Of horses, the number was small. Few were distinguished for excellence of form or movement, or gave evidence of extraordinary power. Probably, the great demand for good horses for use in the army, diminished the number that would otherwise have been on hand. Or, it may be, that the penalty attached to any violation of the statute of the Commonwealth prevents the training and preparation of horses for exhibition on the track, or in any way best fitted to discover their good qualities. If popular sentiment upholds and sanctions horse-racing at these exhibitions, it ought also to approve of a demand for the repeal or modification of this law.

Of swine, there were a few of superior size and condition, which commanded attention and commendation. A similar remark may be made, also, concerning poultry.

But, in the society's hall, there was a display of fruits and vegetables, which constituted the chief excellence of the show. The quantity might not have equalled expectation in such a locality, but the quality could hardly be excelled. Particularly was this to be said of the fruit. In the home of the Concord grape and its originator, and in the exhibition of a society whose members furnish so large a part of the supply of fruits and vegetables in the city markets, such excellence might be looked for. Of both native and foreign grapes, and of peaches and pears there were many beautiful specimens. But of apples, we doubt whether a superior display has, or could have been made, in the State this year.

We missed the pleasure and the benefit of a public meeting at the dinner table. Instead of this, however, a full assembly was gathered in the town hall to be instructed and delighted by speeches from Professor Agassiz, Hon. H. F. French, R. W. Emerson, Esq., and Hon. Simon Brown. Only the lateness of the hour interrupted and closed this intellectual treat.

We have only further to say, that to us, this society appears to stand in the position of an institution laboring under disadvantages, which the officers and members will strenuously exert themselves to overcome. In its past history are many pages which bear ample testimony to its usefulness and its honor. And in its present character, it bears on its records the names and works of men highly distinguished among agriculturists and horticulturists; men who are benefiting the State and the country, and who rightfully claim for the Middlesex Society an honored place among the agricultural institutions of the Commonwealth.

CHARLES C. SEWALL.

MIDDLESEX NORTH.

Mr. Garfield, who was appointed to visit the annual exhibition of the Middlesex North Agricultural Society, held on the 29th of September, 1864, failed to appear, and the officers requested me to report in his stead.

Let me in the outset remind the Board that the rain poured down in torrents from early in the morning until late in the afternoon, which will account for deficiencies in several branches of the show. Members not knowing the rules of the society may be surprised to learn that in some classes the entries reached so large a number. The truth is, the society had determined to have a fair which should transcend all previous ones in point of excellence, and the rules requiring many classes of stock to be entered previous to the day of exhibition, were so made without reference to elements over which they had no control. Only four teams, however, contested in the ploughing match—one single yoke of oxen and one pair of horses; double teams, two yoke of oxen, and one pair of oxen with one horse.

There were four draught horses entered for premium; fifteen different lots of bulls and bull-calves, consisting of Durhams, Devons, Alderneys and Ayrshires, with some grade animals; six entries of working oxen; five of steers. The towns of Tyngsborough and Dunstable each entered a string team. Of milch cows there were twenty-one separate entries. It being requisite that the weight of milk and pounds of butter should be given at various periods, and the principal part of the labor having been performed, the storm did not diminish the number of entries in that class materially.

There were on the grounds Southdown, Cotswold, Leicester and Merino sheep, in the seven entries made, and the opinions are at least as various as the number of breeds as to which is the more profitable.

Ten entries of swine, many individual specimens excellent in appearance. A boar of mixed breed drew the first prize.

Several coops of domestic fowls, of various breeds, all good in their way. Those Shanghais, we are glad to learn, are becoming more and more scarce. Farmers ought not to keep cocks whose crow alone will frighten the children.

One union mowing machine, one horse-rake and a spring bedstead, were among the machines, inventions and implements. We have seen a rocking-chair, with a *fan* adjusted in such a way that the motion of the chair would whirl the fan in the face of the occupant, making respiration easy; and we imagine a spring bedstead a capital invention for those who are too lazy to sleep without some mechanical power being attached to their soporifics.

Of bread, white and brown, some made by matrons and some by maidens, there were fifty-four parcels, loaves, much of it excellent, with butter enough for it all, there being twenty-one boxes in the hall, beautiful, yellow oil of the cow.

Twenty-six contributors of vegetables; and finer, we never saw anywhere. There were two gentlemen, market gardeners, Mr. French and Mr. Manning, of East Chelmsford, who excel in that branch of industry. That is no disparagement of other contributors.

Seventeen entries of assorted fruit and melons. It is but fair to remark, however, that a plate of quinces, and several of cranberries, were entered in this class. In the first-class of apples, five competitors for the prizes. Number of varieties by each, from twelve to forty-two. In the second class, consisting of single dishes, and up to ten plates, there were twenty exhibitors. The show of apples was the best seen by the writer within the last year, with, possibly, one exception. The single dishes of russet, sweet and Gravenstein shown by the president, Ephraim P. Spalding, Esq., were very fine. E. H. Warren had a splendid dish of ladies' sweets, with the bloom carefully retained. Mr. Sargent, of the Lowell and Boston express, presented a large platter of the largest and fairest Baldwins of the season. We think said Sargent made a mistake in varnishing his apples, for a question was raised as to their identity, and such queries have before arisen, where the appearance of fruit has been materially changed by polishing. Clean fruit, picked carefully from the trees and shown with the bloom, if it has any, appears better thus, than any amount of rubbing can make it. There was a grand show of pears, yet no Bartletts, owing to the lateness of the season. Duchess, at a pound each, were plenty. Our Lowell friends succeed in the production of pears in their gardens, protected by high fences and walls of buildings, trees planted in soil made fat and mellow two to four feet deep.

The exhibition of grapes was the finest and most extensive ever known there.

There were peaches, too, of remarkable size and beauty, which make us feel a weakness for them.

That portion of the exhibition hall devoted to household manufactures, fancy articles, &c., was literally crammed, mainly brought in on the afternoon of the 28th.

There were a goodly number of ladies present, some with bedraggled skirts, but their ardor in no respect dampened. We discussed the dinner at one o'clock, when every inch of room was occupied by ladies and gentlemen.

John A. Goodwin, postmaster of Lowell, delivered a spicy address in the dining hall, followed by others, and some of the others were decidedly *long*, for after-dinner speeches. We advise orators, in preparing dinner-table speeches, to use much shortening, and more spice.

In concluding, let me assure you the Middlesex North Society is in a thriving condition. A very rainy day will occasionally occur, and for the time put a damper on the proceedings, but no society can claim exemption from such occurrences. The officers of the society are all practical men, and intelligent, not in the habit of being frightened by rain or snow. Men who have successfully pursued their business privately, will, when associated for a mutual purpose, recognize no such word as fail.

ASA CLEMENT.

MIDDLESEX SOUTH.

As delegate from the State Board of Agriculture, I attended the eleventh annual exhibition of the Middlesex South Agricultural Society, held at Framingham, on the 20th and 21st days of September. All objects and articles for exhibition were arranged on the forenoon of the first day. Committees to view on the afternoon of same day. All articles to remain during the second day. Ploughing match on the morning of the second day; after which, trial of speed, and draft of horses and draft of oxen. Dinner served in upper hall at one o'clock. After which, the address was delivered by Hon. George S. Boutwell—subject, "Sheep Husbandry." After the address, remarks were made by Hon. C. L. Flint and others. The premiums were declared by posting notice at the different post offices of different successful competitors. The hall of the society is sixty by ninety feet, two stories, with basement. The grounds of the society enclose six acres. Admission fee, fifteen cents, other than members. Only three-fourths of the awards of premiums were paid to those not members.

The show of vegetables in the hall was very good. Liberty Chadwick exhibited 152 varieties of vegetables and fruit, among which we noticed six turnips the aggregate weight of which was 67½ pounds.

Charles Morse, of Ashland, exhibited seven mammoth squashes. H. G. White exhibited Hubbard squashes, some of which were a part of 41,000 pounds taken from one acre. The show of peaches was limited. The show of pears and grapes was very fine. J. W. Clark exhibited thirty varieties of grapes. Wm. H. Howe, of Marlborough, exhibited forty varieties of apples; and Crail Howe, of same place, exhibited thirty-eight varieties of apples. A. S. Lewis exhibited thirty varieties of pears. Oliver Bennett, Esq., exhibited fifteen varieties of pears, seven varieties of peaches and one variety of figs; and on his own grounds he shows 1,800 pear trees, fifty different varieties—some eight hundred stands of grapes, twenty-five varieties of out-door grapes, and twenty-five varieties of hot-house grapes, and a superior peach orchard of I know not how many varieties; but of the quality of Mr. Bennett's fruit we can speak personally, as we were not only feasted at the time, but were generously furnished beyond that for future test. There were 256 entries of vegetables by twenty-seven different individuals. There were exhibited 79 varieties of grapes by twenty different individuals; 131 varieties of pears by twenty-six exhibitors; 179 varieties of apples by twenty-two exhibitors. The show of canned fruits, wines, mead and honey very good. Saw no rye bread.

The show of butter and cheese was limited, as also was the show of agricultural implements and miscellaneous articles.

The show of domestic manufactures and fancy work was not what we should have expected from the number of intelligent and good-looking ladies we saw present, but suppose their energies may have been better applied to labors for our patriotic soldiers.

Turning from the hall to the pens of cattle, we found the show of milch cows, young cattle, fat cattle and working oxen, perhaps, about what might be expected from the proximity of the show to a large city, but what would have been called small in some of the more pastoral districts of the State.

There were five entries of blooded bulls, ten entries of working oxen four entries of fat cattle, nineteen entries of sheep, seven entries of swine, and forty-nine entries of fowls. The show of fowls, more particularly of Brahmas, was very good. The show of sheep was mostly Southdown, and exhibited by Mr. H. G. White, and were very fine specimens. We saw no fine woolled sheep, but think they would be a valuable accession to any county or county show. There were a few Cotswolds exhibited. Thomas Hunt, of Sherborn, exhibited a pair of grade Dutch Durhams, six-years-old fat oxen—weight 4,200 pounds; they were very rangy cattle. H. G. White, of Framingham, exhibited his bull Monitor, (Shorthorn Herdbook No. 5019)—weight 2,200 pounds; a very fine animal—in all, twenty head of cattle, fifty-six head of sheep, four Chester County swine, six coops of Brahma fowls, one yoke of oxen, weight 3,700 pounds, raised in Middlefield, Hampshire County. Mr. White's show of stock, fowls and vegetables was very noticeable and creditable for one man.

We did not notice the horses in detail, but saw them trying to exhibit speed inside of a rope-ring, upon a 7×9 piece of ground, which was grassed over, and our impression was that the society needed a good half-mile track, or show their horses standing. I notice those who rear and show blooded neat stock look with utter disgust upon the crowd who rush to the show of speed horses, forgetful of the purse, brains and toil required to breed and develop those beautiful points so much admired by breeders of that class of neat stock. But I believe the officers of most societies conclude it takes some horse to bring the crowd which brings funds.

Charles Moulton, of Framingham, called our particular attention to his exhibition of horses. He has a gray mare indicating speed and endurance—has been offered $800 for her, has raised from her six colts, the youngest now a sucking colt of fine promise. Has sold one colt from her for $1,000. He exhibited a two year old gray from said mare, which he values at $1,000, weight 850 pounds. Also, a colt fifteen months old, bay—"Dictator," sired by Draco—weight 800 pounds—a colt not easily beat.

We noticed a pair of twin sucking colts, a sight not often seen, as mares seldom run their time with twin colts.

The dinner was served in the upper hall. Price of dinner tickets, $1.50. After which, the address was delivered, and only those who had dinner tickets could hear the address.

We noticed that of eleven towns represented in the society, Framingham took, last year, almost two-thirds of the premiums, and will probably this year take about the same. This is not as it should be. There were no entries of forest trees, hedges, grain or root-crops.

The collection of people the second day was judged to be about 5,000, and we were very favorably impressed with the general quiet, good behavior and interest, as well as general intelligence manifested by all persons present; and as they mingled together, all seemed conscious of their own and each other's happiness, and that they were having, not merely in name, but in reality, a farmer's holiday; and with that constant toil exercised by most farmers and their families of Massachusetts, it is desirable that they should at times turn for observation and recreation, and as we saw the interest manifested and pleasure taken, we were impressed with the fact that our annual fairs are doing very much to raise the standard of the farmers of Massachusetts.

We cannot close without expressing our profound thanks to the worthy president of this society, William G. Lewis, and secretary, James W. Brown, for their united and untiring efforts to afford us every facility for observation, and to make our visit interesting to us; and also to H. H. Peters, of Southborough, who came for us at the close of the first day, and returned with us in the morning, in the intervening time making us the recipient of his generous board, and showing us one of the best kept, permanently improved and finest farms in Massachusetts, and also fifty thoroughbred Ayrshire cows, as much alike as so many pease, and in just the right condition of flesh to give the greatest flow of milk, and, we venture to say, the best lot of Ayrshire cows in the United States; and we renew our thanks to J. W. Clark, Esq., for his attentions to us, and for the facilities afforded us of seeing the surrounding towns, and the thrift and pleasant country homes occupied by the men and families of persons doing business in Boston, who are afforded every facility of convenient conveyance by the Boston and Worcester Railroad. Said road having an eye to its own interest and the interest of its patrons, by offering such inducements of railroad as are building a continuous line of country homes from Boston to Worcester, whereby men do business in Boston and live with their families in the country. The Boston and Worcester Railroad and its patrons are on the best of terms. Mr. Clark has but two acres of land, yet he has it so diversified and laid out that in observing all that is beautiful and useful, one would think they were looking over a score of acres; and among the many of his fruits we were shown a seedling grape, called the St. Catharine, of very fine quality, which ripens much earlier than the Concord, and is perfectly hardy. Oliver Bennett, Esq., has also a seedling grape, called the "Framingham Seedling," of good size and quality, and which ripens four weeks earlier than the Isabella. To secure a large crop of peaches every year, and protect his trees, Mr. Bennett collects a few branches together and binds them in straw, and then binds several of these together; and to render the operation more convenient, he cultivates the growth of limbs close to the ground; the straw is removed in the spring, as the blossom buds begin to develop.

With our best wishes for the permanent success of the Middlesex South Agricultural Society, and all those therewith connected, we turned our face towards the Worcester Society, at Worcester.

C. O. Perkins.

WORCESTER.

By invitation of Charles E. Miles, Esq., President of Worcester Agricultural Society, I had the pleasure of attending the forty-sixth annual show of that society, held at Worcester on Thursday and Friday, September 23d and 24th. Upon my arrival at the hall I was very cordially received by the officers of the society, and the appointed delegate not being present, I was requested to report in his stead.

By the kind attentions of the Secretary, John D. Washburn, Esq., and by access to his books, and through the constant attention of the worthy president, I was afforded every facility, that I might bear full testimony to the success and prosperity of this, one of the oldest and wealthiest societies in the State, and also representing one of the best farming districts. The society's grounds inclose sixteen acres, with a hall fifty by one hundred and twelve feet, and three and one-half stories high.

The arrangements of this society are that the show of cattle, sheep, swine, poultry, &c., should be on the first day, as also the dinner and address, leaving the second day almost entirely to the exhibition of horses.

There were eleven entries of bulls, sixteen entries of cows, thirty-four entries of working oxen, seven entries of three-year-old steers, sixteen entries of one and two-year-old steers, four entries of fat cattle, nine entries of ewes, seven entries of bucks, and twelve entries of swine. There was a very fine show of poultry, among which we noticed eight pure-white swan geese, exhibited by C. B. Pratt, extra fine. M. L. Wood, of Grafton, exhibited very good Spanish Merino sheep. We saw some fine specimens of swine, of which we think the Chester County breed takes the preference. William Eames, of Worcester, exhibited some fine specimens of grade Devon cows, among which were some that took premiums at the New England Show, Springfield; and one engaged our particular attention, a bright-red cow, nineteen years old, being half pure Shorthorn, and half pure

Devon, showing marked evidence of constitution and milking qualities ; and we think there are no finer cattle or better workers or milkers than the intermixture of Durham and Devon stock. John Brooks, of Princeton, exhibited a large stock of good Jerseys. There was a large show of fine milch cows from the town of Barre. Col. W. S. Lincoln exhibited fine Jerseys. We think the show of Jerseys the largest and best we have ever seen. Harvey Dodge, of Sutton, exhibited fine Devons, and also a large show of vegetables in the hall. We noticed the very fine thorough-bred Ayrshire bull "McIver," owned by Bela J. Stone, also the Durham bull "Montauk," owned by Chaffin & Bigelow, Worcester. We noticed a good many fine steers, particularly a pair of Devon and native yearling steers, pretty as could be, by Frank Batchelder, of Sutton. The show of steers would have almost induced us to think we were on our own native highlands, only more so, except for one feature. The steers all had their tails nicely shorn from the roots down, leaving a nice little bush at the end, which struck us as somewhat of a novelty, but upon second thought, we remembered that we had seen army blankets for the soldiers that partook more of hair than wool, inducing us to believe that hair in these war times is an article of commerce, and that the Worcester County boys might have an eye to profit as well as trade. We noticed a fine show of cows from the State Hospital, Worcester, some of which were thorough-bred Durhams; also a fine pair of oxen. As a whole, the exhibition of cattle was uncommonly good, and we are well aware that in our brief notes we have not done justice to all.

The show of implements, both outside, where we saw the farm implements, and inside, where we saw the indoor, family, labor-saving machines, was very numerous and good. Every year brings its improvements and additions, and farming is fast emerging from drudging toil to mechanical systemization and brain labor, whereby less pains show greater gains. The extensive show of implements reminded us that we were in Worcester, where they do more at the manufacture of such than in almost any other place in New England.

In the hall we noticed on exhibition over one hundred cheeses, new and old, sage and old sage, and if looks do not deceive, those who eat will hardly know when to stop. There was a large display of butter, and most of it must have been Devonshire butter, at least it was that color, and one noticeable feature was that it was in boxes holding from ten to twenty pounds, made in balls of one pound each, and placed in the box so that they did not touch each other ; the balls were oblong, some square and some hexagonal ; we suppose they were made for market, and being made to weight would obviate all necessity of weighing scales, and we were satisfied would delectate the palates of the purchasers. The show of vegetables was very good, particularly of onions, potatoes, squashes, and some of the largest turnips we ever saw.

Of the ladies' department we cannot speak in detail, further than that there was a fine display, and men and women are, to sum the whole thing up, the most interesting features of every show; besides, we were informed, the Worcester Horticultural Society had an exhibition at the same time, which left the Agricultural Society's Hall a matter of fact and not of fancy.

There were six entries of stallions, nineteen entries of family horses, seven entries of matched horses, twenty-three entries of colts, and twelve brood mares. We cannot speak of their merits from observation, but judging from the crowd, there must have been merit, as the attendance on the second day was greater than on the first, with all its various attractions. This reminds us that our attention has been called to this subject, and the breeders of thoroughbred stock are very much annoyed that so much importance is given to the horse at our local shows, and also at the New England Show, and cite the New York Show as a counter example. The Show of New York is made up, almost entirely, by rural men, men who are willing to spend a day in looking at the good points of a good animal. But Massachusetts is made up more of mechanics and a manufacturing population, a body of people who move and like to see things move. These people need their holiday, and would like to come out and see what the farmers can show; and if our shows should embrace only farmers, they would embrace only a small part of our community. Our shows find it politic to cater to the tastes of the mass. Every class has its speciality. Cattle men enjoy looking at the good points of good cattle; sheep men at the good points of sheep. More who are judges of neither cattle nor sheep must find enjoyment somewhere, and judging from the way things take, the horse furnishes more of it than any other one object. It may be said that fast horses make fast men, and that such may be true cannot be denied, when we find that a show here in Massachusetts, with receipts of over $14,000, cannot be made to pay its way; and the genuine live Yankee has fast motions and notions which are not to be despised at home, and he always finds a place abroad, and there is nothing too fast for him. Think he would ride on the telegraph if he could only get aboard.

The Worcester Society have a fine dining hall, and it was well filled at the dinner, after which the society were furnished with an interesting address from William S. Lincoln. Subject: "Virginia as the war found it, and as it is now leaving it." Ex-Governor Lincoln, of more than eighty years, with whom time has dealt very tenderly, came forward reluctantly but very pleasantly, to the call of the president, and said that forty-six years ago he came forward at the call of the society, and ought to be excused now. He said some were frightened at prices in connection with the war, but he thought there was not cause for alarm. He had seen very much higher prices; flour $30 per barrel, wool $2 per pound, sugar 50 cents; the time when the girls played on different music from now; when they could spin yarn that was not street yarn. The ex-governor was followed by remarks from the worthy Secretary of the State Board, Hon. Charles L. Flint; and thus ended a pleasant feature of the Worcester Agricultural Society.

C. O. Perkins.

WORCESTER WEST.

As a delegate from the State Board of Agriculture, I visited the Worcester West Agricultural Society's exhibition, at Barre, Sept. 29th, 1864.

The day was exceedingly rainy and unfavorable for the exhibition, and, as a matter to be expected, kept away many persons, and also reduced the number of animals and articles exhibited.

The first thing my attention was called to was the ploughing match, which was contested by six single teams, of one pair of oxen each. One of the teams, owned by Mr. Carpenter, of Charlton, showed remarkable fine training, and did the work very well. After the ploughing match was over, I had the pleasure of viewing the cavalcade and the single and double teams of horses pass around the common. They made a fine appearance, and embraced many good specimens of the Morgan breed of horses.

Then came the trial of working oxen and draught horses, which was well contested by some very fine animals. The same can truly be said, also, of the exhibition of horses and colts, and we noticed many animals among them that were creditable to their owners.

In the pens we found many excellent animals, particularly the milch cows, nearly all of them grade Durhams; some of them are evidently large milkers, and apparently well adapted to the wants of the farmers of Worcester West, who give their principal attention to the dairy for making cheese; but I would suggest to them that an infusion of the best Jersey blood would make their fine cheese better yet. Still, I came away thoroughly impressed, from examination of the stock on exhibition and stock belonging to farmers in and about Barre, that they have got a class of animals in these grade Durhams quite well adapted to their luxuriant pastures and good keeping, and for cheese-making cannot be excelled, at least in the quantity that they will make.

The heifers and heifer calves in the pens, like the cows, were large, well-developed and well-bred, and were creditable to the society. There was a small exhibition of sheep, said to be good specimens, and a meagre show of swine, which at other shows would be called inferior.

In the town hall there was a fine display of manufactured articles. Also vegetables, fruits, flowers, butter and cheese. Here the Hardwick Cheese Company had a cheese on exhibition weighing 300 pounds, and the Barre Company a number of very fine cheeses of the usual weight made by them, eighty-five pounds each. This part of the exhibition attracted a good deal of attention, and was largely attended during the day.

At one o'clock the services commenced in the church, where the audience listened to an able and instructive address from ex-Governor Washburn, after which the society and invited guests partook of a dinner at the Massasoit House. After dinner was over, the audience had the pleasure of hearing speeches full of wit and eloquence, made by Governor Andrew, ex-Governor Washburn, Hon. Oliver Warner, the president of the society, and others, which, with reading the awards of premiums, closed the ceremonies of the occasion.

This society labors under disadvantages in not owning a lot and buildings of their own, in which to hold their exhibitions; and I would suggest to men of means within the limits, or interested in the society, to furnish sufficient money for this purpose, and have no doubt that money spent in this way would be beneficial to the public and to the farmers of Worcester West.

I left with the impression that this society is doing its share in the work of improvement by awakening the attention of the farmers in its vicinity to the importance of agricultural progress.

By invitation of Mr. Ellsworth, I visited the Barre Cheese Factory, where they commenced making cheese last spring, and witnessed a portion of the process of converting milk into cheese, which is here done in a neat and scientific manner, and so uniform is the method of manufacture, that every cheese is nearly alike in size, taste, and quality, and the company, which is composed of the farmers who furnish the milk, appear to be well satisfied that it is a better way than to make it in private dairies, and more profitable, and it certainly saves much hard work to that already over-worked class of ladies, farmers' wives.

The superintendent of the factory finds that it takes 11¼ pounds of milk in June, and 8¼ in September, to make one pound of cheese. The September cheese is also richer and better than the June. This company charges outsiders one cent and the whey for each pound of cheese made, but expect that the whey alone will pay expenses.

According to their figures, a *milkman's* can of seven quarts, (which really holds eight quarts and one pint, wine measure,) full of milk, was worth for cheese-making at their factory in Barre, in June, a fraction over thirty-six cents, and in September about forty-four and one-third cents per can.

In conclusion, I desire to say that I am indebted to the president of the society, and to Mr. Ellsworth, for their constant and kind attentions during my stay.

JOHN B. MOORE.

WORCESTER NORTH.

The annual exhibition of the Worcester North Agricultural Society opened at the town hall in Fitchburg, on the evening of October 27th.

There was a fine collection of the various products of the garden, the orchard, the vineyard, and the dairy. The ladies had not failed to contribute liberally to the attractions and enjoyment of this annual festival, by offering numerous specimens of fancy and ornamental work.

Among the largest exhibitors of choice fruit were Dr. J. A. Marshal, Hon. Alvah Crocker, and Dr. Jabez Fisher.

Gardner P. Hawkins, of Fitchburg, showed seventeen varieties of choice apples grown upon his house lot, containing not more than one acre of ground.

Dr. Fisher exhibited sixty varieties of pears, and six of grapes. Of the latter, he has six acres—mostly of the Concord variety—in bearing.

The cattle show proper opened on Wednesday morning.

First in the programme, was the ploughing match, at nine o'clock. The field selected was well calculated to test thoroughly the capacity of both plough and team, as well as the skill and patience of the ploughman. The surface was uneven, the soil varying from a somewhat gravelly loam to a hard, clay loam, with a generous sprinkling of small, loose boulders. The skill with which the work was accomplished under these difficult circumstances, gave evidence that this was to them only a specimen of every-day life, and presented no obstacles which these ploughmen could not readily overcome; except in the case of one individual, who having exhausted his stock of three plough points, was obliged to retreat and leave his land unfinished.

One feature in the operations of this society deserves notice, and is worthy of imitation by other societies. This is the encouragement of boys, by offering special premiums for ploughing done by minors, and with steers. Two entries were made in this class, and the skill and energy with which these mere lads performed their tasks, as also the training to which the steers had been subjected, showed that the efforts of the society in this direction had not been in vain.

At eleven o'clock, came the trial of working oxen, upon a cart loaded with stones. The load was graduated in exact proportion to the weight of the oxen, each being required to take (including cart) thirty-three per cent. more than its own live weight. This is readily arranged by the addition or removal of stones, each of which has its weight distinctly marked upon it. In the class of working cattle were thirteen pairs, mostly well matched, thrifty cattle, of medium size.

The miscellaneous stock was exhibited in pens put up for the occasion upon the common, and consisted in part, of fourteen bulls, twenty-five cows, five pairs of fat cattle, three fat cows, forty-one heifers and heifer calves, sixty-six steers, sixteen swine, thirty-six sheep, and ten coops of poultry.

A good degree of interest is manifested in the welfare of the society, as indicated by the number of entries. Yet in regard to neat stock, it appears too evident, that the mass of farmers within the limits of this society have hitherto been too negligent in the selection of breeding animals. As, however, the spirit of improvement is already manifest in the introduction of *pure bred* bulls, and as the society have now excluded all others from their premium list, we may look with confidence for rapid and continued improvement in this important branch of husbandry.

The exhibition of horses was all, and more than could have been expected, considering that the society has no suitable place for this purpose, and also the fact that another organization was holding a horse show within the limits of the town at the same time.

This last, is a matter over which this society has no possible control, and to their credit be it said, they are able to maintain the interest in their strictly agricultural exhibition, while during the whole time a so called *horse fair*, is being carried on with a distance of less than two miles.

The whole number of horses exhibited was ninety-six, viz.: stallions, ten; breeding mares, seventeen; draught and family horses, thirty-four; horses in pairs, twelve; colts, twenty-three.

I have thus glanced hastily and imperfectly at the doings of this society which is evidently in a healthy and flourishing condition. Its most apparent present need is that of suitable ground upon which to hold their exhibitions. This want will doubtless be supplied in due time, as its officers and members appear to be fully aware of its importance.

In closing, I wish to express my thanks to the officers of the society, and to others who cordially welcomed me as your delegate, and who contributed in various ways to make my visit both pleasant and profitable.

P. STEDMAN.

WORCESTER SOUTH.

On the morning of October 16th, 1864, we found ourself at a boarding-house in the centre of Sturbridge.

Recollected riding upon the outside of a stage the preceding evening, some eight miles, in company with eleven others, a majority of whom were bound for the cattle show of the Worcester South Agricultural Society. Inside passengers were crammed in so closely, and darkness drawing around us long before we reached the village where they began to alight, we never learned the number who were favored with inside seats.

The morning referred to dawned inauspiciously,—clouds, dark and lowering, indicated rain, which, after a time, fell in sufficient quantity to mystify the minds of many and prevent a large assemblage at an early hour in the day. As the time approached for the ploughing match, and desiring to witness the same, I was fortunate in meeting Dr. Hartwell, chairman of the committee, when we wended our way to the ground allotted to that branch of the exhibition. We found that ten teams had been entered, each single pairs of oxen, and all upon the ground, ready to contest for the prizes. The land was tough sward, rendered still more difficult by the drought, from the effects of which it had not fully recovered. At the appointed time, however, the teams all started and performed the task assigned in workmanlike manner. The larger and more efficiently trained cattle got through quicker and with greater facility than others, yet the work, considering the circumstances, was nobly done. Formerly, the land had not been deeply ploughed, and we think the committee acted wisely in demanding greater depth of furrow slice. Shallow ploughing, except for special purposes, and where it cannot be avoided, should never be practised.

On returning to the village, the cattle pens were all found to be occupied, and many cattle tied to stakes and posts prepared for that purpose outside the pens. First, we noticed a Durham bull, seven years old, and owned by Edmund Capen, of Charlton. His weight 2,300 pounds, of good proportions; but we think he had been kept long enough for all useful purposes of this world.

The herd of ten, with nineteen others, half Ayrshire, all the property of Bela J. Stone, of Sturbridge, were fine appearing animals. Two pairs steers, two years old, grade Durhams, by S. F. Marsh, of Sturbridge, so handsome that the term lubberly could not in justice be applied to them.

The herd of ten, one and two years old, belonging to Dexter Nichols, of Sturbridge, grade Devons, were remarkably fine-looking animals.

Simon Carpenter, of Charlton, was on hand with a herd consisting of a bull, a cow, with heifers and steers to make the required number, which appeared well.

We searched in vain for fat oxen, and were scarcely more successful in finding any neat stock which was of that class. Two cows alone were to be found, and, upon inquiry, I was informed that the butchers had scoured that locality through and through, picking everything to which the term beef could be applied.

Among the sheep were ten good natives, the property of Bainbridge Doty, of Charlton. Also, a beautiful buck, "Gen. Grant," seven-eighths Leicester and one-eighth Cotswold, owned by the Hamilton Woollen Company.

In a capacious cage upon four wheels, we noticed a large swine. Made an effort to learn the weight, but did not succeed. A brood of clean, white, fat, short-snouted pigs pleased us. They looked contented and sleek—seemed to be taking on fat without making effort to do so. While looking at those pigs, my mind reverted back to the days when droves of swine used to pass our place, coming all the way down from the queen's dominions on the north, which were not unfrequently denominated "Canada land shad." Sometimes it has occurred to our mind that they were of that breed which, on one occasion, were beset by foul spirits, when the whole herd ran violently down a steep place, and were drowned. Be that as it may, they certainly resembled, to some extent, a female shad on returning to the ocean after the spawning season, so far as flanks and sides were concerned. With legs nearly the size of pillars formerly used in supporting an old fashioned piazza—ears resembling more a blacksmith's apron than anything else—snouts like a pick-handle, with a flange on the outer end, which enabled them to dig post-holes or any other holes where it would cause the perspiration to flow freely from a biped to perform the same amount of labor with the improved implements of the present day. Vast improvements have been made even in the race of pigs. Well, let them go on.

There were several coops of domestic fowls, which compared favorably with other shows of the kind witnessed on other occasions.

In the town hall, the mechanical department was, in part, represented by Litchfield & Co., of Southbridge, shuttle-makers. Side by side were shown the shuttles used in olden time in connection with the hand-loom, with the various patterns used with the different improved power-looms of the present day. While viewing them, my thoughts ran back forty years, to the time when I was required to sit by the "quill-wheel" and wind quills for my aged grandmother, which she used in just such a shuttle as one of the samples before me. What memories revived at the sight of that old shuttle! But we cannot stop to relate them here.

Benjamin H. Franklin, of Southbridge, had on exhibition a machine for boring in corners where a common auger or bit could not be used. Said machine could be adjusted at will, so as to bore at any desirable angle, and must be very useful. By the same, a steel ten-foot pole, in four parts, which could, with facility, be converted into a walking stick. A rather curious and, we should judge, convenient contrivance. Mr. Franklin had several other machines and tools of his own manufacture, which evinced skill and ingenuity on the part of the designer.

The handiwork of the ladies was not shown on so extensive a scale as we have witnessed elsewhere, yet what fancy articles and household manufactures there were, bespoke taste and judgment on the part of the contributors to that department.

Mr. Haines, secretary of the society, and the harness-maker of the village, presented some fine specimens of his handicraft.

There was a superior display of vegetables, in almost endless variety, George S. Allen, of Brimfield, showing three squashes upon one vine, the aggregate weight of which was 268 pounds. We hope no one will feel encouraged by this notice to attempt the production of mammoth squashes, for they are worthless, except as food for stock, and for that purpose other vegetable products are more easily raised, besides being better. For culinary purposes, the turban, marrow and Hubbard squashes exhibited were of the right stamp. In our experience, we have found the Hubbard squash more hardy and less liable to be destroyed by bugs than the marrow; but in dry, hot weather, like that with which we were visited last summer, it requires much attention to save squash vines from the ravages of the striped bug, and last, though not least, the larger pumpkin bug, commonly so called. This latter has the power, when disturbed, of emitting a strong odor of nationality, or rather of individuality; for the moment you pinch one, the flavor is unmistakable. A little air-slacked lime sprinkled over the plants and on the under side of the leaves, just enough to give them a white coating, is the best article to drive off the striped bug, and wholesale slaughter the only effectual remedy for the black marauder.

There was a very respectable display of fruit. Peaches, grapes and pears, however, were rather scarce. Apples abundant, and fine specimens. D. R. Taylor, of Warren, showed a plate of what he termed the Golden

Eagle, which were large and fine in appearance. L. Draper, Jr., of Brookfield, a dish of red Winter Sweets. Luther Hammat, of Sturbridge, contributed thirty-four varieties, some of which were new to us, as were those previously named. The largest and finest specimens of the Garden Royal we ever saw were there. Mr. Hammat, of whom we have spoken, we should judge to have seen sixty winters; he is an enthusiastic cultivator of fruit. We spent an hour or two in looking over his grounds, where we saw an apple orchard in excellent bearing condition, and upon a side-hill among the rocks, where never a plough entered the soil, and probably never will, owing to the impracticability of driving a team where the natural impediments cannot be overcome. The trees were all grafted with choice varieties. A part of the season, sheep are permitted to graze among the rocks in the orchard.

The fair continued two days. George S. Hillard, Esq., of Boston, delivered the address, which was listened to with marked attention by a large audience.

After the oration, a procession was formed—marched to the dining-hall, where ample justice was done to the viands prepared for the occasion. The inner man having been well cared for, Dr. Hartwell was called upon for a speech. The doctor related a thrilling incident that occurred in his early manhood, and in which he was an interested party, the relation of which brought down the house. There were many ladies at the dinner table, and all about the hall and grounds. The fairer portion of creation seemed to enjoy what was going on quite as well as the sterner sex.

On the second day, many fine horses were on the ground for exhibition, and there was some trotting round the common; though, owing to the great crowd of spectators, much caution had to be exercised.

Our visit was an agreeable one, and our thanks are due to Mr. Hubbard, president of the society, Dr. Hartwell, Mr. Haines, Luther Hammat, Esq., and others, for courteous attentions during our sojourn of forty hours in Sturbridge.

Asa Clement.

WORCESTER SOUTH-EAST.

The Worcester South-East Society held its annual show at Milford, on the 27th and 28th of September.

The first day was spent in preparing matters and things out of doors and at the hall, with the exception of showing horses. The trial of carriage horses came off according to programme, at 1 o'clock, P. M.;

the trial of farm horses at 2½ o'clock, P. M. These trials took place precisely at the time, and this punctuality was kept up through the exhibition; which is the first principle in all transactions. The driving of carriage horses was rather promiscuous than otherwise, they having no special track. Some fine horses were there. The trial of draft horses was very respectable. Having arrived the previous evening, I stopped at the well-kept house of Wm. H. Staples. The first day went with Mr. Carpenter and saw some three hundred pear trees, in successful bearing. Called at Mr. Putnam's, who had a large amount of squashes and a great variety, some of which he exhibited, together with many other vegetables, most of which were hard to be beaten. The show in the hall, in its several departments, was good; that of apples, very extensive; but the lustre made on them by rubbing, is not in good taste with me. The ladies exhibited some fine specimens of their skill, among which was an artificial flower tree, that discovered great ingenuity in its formation.

Second Day.—The ploughing took place at 8½ o'clock, A. M. I think there were twelve entries, two of horses, The famous cattle that took the first premium at the New England Fair were there. Without particularizing, the work was as well done, if not the best, that I have ever seen, and was viewed by more than two thousand people. The show at the park of draft oxen and teams was respectable; sheep and swine pretty fair, but not large in number. The various kinds of fowls were well represented.

An extra dinner came off at half-past twelve o'clock, got up by Mr. Staples; at 1¼ o'clock marched to the church, to the music of the Milford brass band; here were feasted by the flow of soul and science, by F. D. Huntington, D. D., of Boston, whose subject was, "The Odds and Ends of Farming."

I would here say that Milford, in 1830, contained sixteen hundred inhabitants; it now claims ten thousand.

The first day of the fair, Mr. Mayhew—who, by the way, I think very much of a gentleman—invited the Secretary of the Board of Agriculture, with myself, to his fine residence, and feasted us on pears and otherwise refreshed us.

I was under the necessity of leaving for the cars before the reading of premiums, and not having any report of them, I stop here, by giving my good wishes for their success, and thanks for the gentlemanly treatment by the officers and others whose acquaintance was made.

ALURED HOMER.

HAMPSHIRE, FRANKLIN, AND HAMPDEN.

The annual exhibition of the Hampshire, Franklin, and Hampden Agricultural Society was held at Northampton, on Thursday and Friday, October 6th and 7th. The collection of cattle, though not so large as has been exhibited on former occasions, was highly creditable in quality. The Shorthorns, which have so long been bred in this region, predominated, and presented all the attractions for which that breed is so remarkable. It is doubtful whether, in any other part of New England, the introduction of this blood has been pursued with so much care, and attended with so much success, as in this. The selection and breeding of pure-bred herds have been pursued here with great judgment and diligence, by men who would have made their mark as farmers, in any section of the country. And it is well known that some of the most successful attempts at the improvement of cattle by long-continued admixture of Shorthorned blood, have been made within the limits of this society. Nature has done much to encourage this branch of industry in this valley and the territory adjoining. It is here that the most successful experiments in reclaiming pasture lands have been made; and the soil has seldom refused to furnish an abundance of herbage, when it has been subjected to judicious treatment.

The herds of Paoli Lathrop, Esq. and Milo J. Smith, Esq., in which the best Shorthorned blood has been introduced and kept in all its purity, were exhibited as specimens of the quality of that breed of cattle, which has done so much for the agriculture of the valley of the Connecticut; and they certainly bore strong testimony in favor of the family to which they belong.

Passing from these to the grade animals, whose parentage on the male side has been kept pure for many generations, and which represent the value of this mode of breeding, we come to the herd of the Messrs. Anderson, of Shelburne. The excellence of these animals is a striking illustration of what can be done by diligent attention to the selection of breeding animals, and by a careful and patient effort to render a farm well adapted to a rapid development of the animal structure. Not many years ago, the farm of the Messrs. Anderson corresponded pretty well, both as regards stock and condition of the pastures and tillage lands, with most of the farms about it. It was then capable of producing ordinary crops and ordinary cattle. Now its pastures in summer, and its mowing lands for winter, are capable of feeding such animals that nineteen of them weigh 26,500 pounds, and bear all the proportions of the most thrifty cattle. An increase of weight to the amount of 500 pounds in one year, has frequently been made by some of these animals. And it would be a most interesting and valuable addition to the agricultural records of the Commonwealth, if the Messrs. Anderson would furnish a statement of the profits which have attended their mode of rearing heavy cattle on a New England farm.

The exhibition of sheep was confined to the English varieties, Southdowns, Cotswolds, &c., and was consequently small.

The exhibition of fruit in the hall was excellent. From the town of Hatfield there were collected 170 plates of apples and other fruit. The show of pears was good; and that of grapes was quite remarkable. Of the out-door varieties, Isabellas and Concords far outnumbered all others. The specimens of vegetables exhibited indicated great care and skill in the cultivation.

Of the remaining attractions, the address, the dinner, and the trials of speed, it is sufficient to say that they furnished the instruction and entertainment usually expected on such occasions.

The society is in a flourishing condition, and on its anniversary brings together some of the most enterprising and successful farmers of the Commonwealth. For cattle and field crops it stands in the front rank. There is no doubt that it will one day exhibit wool-growing sheep, as another and a highly profitable product of its fine hill-pastures, and luxuriant meadows. GEO. B. LORING.

FRANKLIN.

The fifteenth annual cattle show and fair of the Franklin County Society was commenced Thursday, September 29th. A severe rainstorm set in about eight o'clock in the morning, which kept away some stock and large numbers of people. The show, notwithstanding the unfavorable weather, was an excellent one.

There were on the ground five herds of from 15 to 30 each, and better herds cannot probably be gathered together from any county in the Commonwealth. The cattle were mostly grade Shorthorns, although there were numerous thoroughbred animals. These were mostly Shorthorns, though there were several Jerseys.

Among the most noticeable animals thoroughbred, were the Shorthorns of George E. Taylor, of Shelburne, and Josiah Fogg, of Deerfield, each having a herd of 15 superior animals.

Among the best grade Shorthorns was the herd of the Andersons of Shelburne, of 22 head, which are much admired wherever exhibited, and which are not beaten in any part of the country; and whose excellence is due in a great measure to the care bestowed upon them and the manner of making the hay on which they are fed in winter, and to the improvement of their pastures, so that there is a steady and rapid increase from the time they are calved till they are turned over to the butcher,—a course which gives them larger profits, and well deserves the imitation of farmers generally.

Also the herd of O. O. Bardwell, of 27 head; of P. D. Martindale, of 20 head, and of George P. & W. W. Carpenter, of 30 head,—not a poor animal among them.

The working oxen and steers were numerous, and all of them a credit to their owners. There were no town teams exhibited. There were several specimens of Jerseys which were good, and various other animals, too numerous to mention, all of which were good; and, as a whole, I have never seen the neat stock exhibited at this fair equalled by any county.

The show of sheep was, perhaps, never equalled in the State, there being about 500 head on the grounds, and many of superior quality. Among them five flocks of from 40 to 120, each contesting for the Grennell premium.

This large display of sheep indicates that the farmers of this county find the growing of sheep a profitable branch of farming, and one which farmers in other parts of the State, where sheep are almost unknown, would also find profitable. Among the benefits of sheep husbandry are the quick returns which the farmer gets from his investment, and also the ease and comparatively small sacrifice with which he can reduce his stock to his fodder, in case of a short crop of hay like the present, and also the readiness with which he can stock up again without purchase, by taking a little extra pains in raising lambs, so that many a farmer has benefited his flock by the process more than he has sacrificed.

The show of swine was good, and, although not large, they would all do honor to any farmer's pen.

The show of poultry was small, but of good quality.

There were but few agricultural implements on the ground.

The show in the hall was excellent, and one of the noticeable features was that almost every article was of superior quality.

There was a good display in the mechanical arts, and the articles were somewhat numerous.

There were of fruits 34 entries, 16 of apples, some entries comprising over 30 varieties; 8 of pears in one instance, consisting of 18 varieties; 10 of miscellaneous, embracing quinces, peaches, grapes, &c., together with basket of last year's apples.

There were 46 entries of bread, 19 of butter, 5 of cheese, and 62 of domestic manufactures, 41 of fancy articles and needle-work, 13 of fine arts, 28 of flowers, said to be the best display of flowers ever made in the hall, and it was indeed a splendid sight.

Of maple sugar and honey there were 11 entries; miscellaneous articles, 11; pickles, preserves, jellies and canned fruits, 13; vegetables, 44.

By far the richest display was in fruits and flowers. The fruits were as tempting to the palate, as the flowers were pleasing to the eye, especially the grapes, one entry of which consisted of 25 varieties.

The numerous specimens of bread and butter did great credit to the ladies of this society, especially the butter, which I never saw equalled in any society, in quality; and it was evident that if the husbands know how to raise the best stock in the State, the wives know as well how to manage the dairy. As a whole, the show in the hall was one of the best the society ever held.

At four o'clock a procession was formed and marched to the society's grounds, where an address was delivered from the judges' stand by the Hon. Henry L. Dawes. The subject was, "The Massachusetts Farmer, as he was and as he is to be." It contained much to interest and instruct. The rain continued during the entire delivery, and but a few hundred people were there to hear it.

Friday, the day for the horse show, opened with a heavy rain. The members of the society soon began to make their appearance in the street, but owing to the continued rain and mud, at an informal meeting of the society it was voted to postpone the horse show till Tuesday, October 4th, so that I left without seeing the thing finished, and can make no great report of its doings, but can say from newspaper reports, and from report of members, that the entries were large, and the show one of the best of the society.

This exhibition of the society has demonstrated that there is no lack of interest among the members, and that stock raising, and agriculture generally, is steadily progressing in the county.

The business of the society appears to be conducted with fidelity, energy and ability, and is doing great good to the community.

Matthew Smith.

HAMPDEN EAST.

As delegate of the Board of Agriculture, I attended the annual exhibition of the Hampden East Agricultural Society, at Palmer, on the 10th and 11th of October. The members of this society had on exhibition specimens in all the usual departments of our agricultural shows. The ploughing match, trial of working oxen, exhibition of horses, had each their allotted hour. There were fine specimens of young stock, two and three years olds. Butter, cheese, vegetables, fancy work, and domestic manufactures, were creditably represented; but the stock department, as a whole, both of horses and cattle, was decidedly inferior.

The show of men and women, of active, inquiring, interested spectators, was deplorably small. And, though it was my pleasure to meet many wide-awake, intelligent farmers of Eastern Hampden, yet I could not avoid the conviction that there was, in the section over which that society operates, a great lack of interest in the aims and objects for which the society was organized; and that if the Hampden East Society would make the best, nay, the legitimate use of the bounty of the State, great exertion should be made to arouse that agricultural community to the importance and necessity of making a better use of their opportunities.

A good audience of the citizens of Palmer assembled in one of the village churches, and listened to an address of Mr. Blair, one of the estimable citizens of that town. LEVI STOCKBRIDGE.

BERKSHIRE.

The annual exhibition of the Berkshire Society was held at Pittsfield, on the 4th, 5th, and 6th of October, and was highly successful. The interest which belongs to this long-established society, one of the oldest in the country, is such as to render it a special object of attention. And it is gratifying to know that its prosperity and vigor are not in any way diminishing. The record which it possesses is of unusual value. Its founders and early patrons were men who had large comprehension of the importance of agriculture, and applied intelligence and industry to their labor on the land. The attitude assumed by them toward all matters of public importance, and their understanding of the wants of our country which the farmer could supply, render their written opinions, as found in the first manuscripts of the association, suggestive and valuable. It is somewhat remarkable that this zeal and industry, so worthy of all imitation, in furnishing contributions to the agricultural literature of the country should not be imitated by those who now conduct the affairs of the society. Berkshire is one of the most interesting agricultural sections of our State. Its farming is varied and successful; and it is to be hoped that for the future some more thorough record of the transactions of the society, and of the modes of agriculture which it is called upon to encourage, will be secured and published.

The entries at the exhibition, in all its branches, were sufficiently large. Some of the crops it may be well to enumerate, as significant of the industry which occupies the attention of the farmers there. Of spring wheat there were 5 entries; of winter rye, 13; of oats, 18; of meslin, 5; of barley, 13; of grass, 4; of sowed corn, 2; of corn, 25; of beans, 3; of flax, 1; of tobacco, 7; of carrots, 1; of turnips, 2; of ruta-bagas, 1. The quality of these products was good; and it was encouraging to find so many entries in this large grain-growing section of the State, in accordance with the rules laid down by the Board of Agriculture, for securing an accurate account of the mode of cultivation and the crop. We truly wish that these statements were published in full by the society. Those methods of cultivation which will produce 36 bushels of wheat to the acre, 70 bushels of winter rye to the acre, 88¾ bushels of oats to the acre, 45⅝ bushels of barley to the acre, 72½ pounds of corn to the rod, "the green weight on an average rod of ears," as stated by the committee, or 11,500 pounds to the acre,—ought to be carefully recorded for the benefit of those in other parts of the Commonwealth, who are striving to raise good crops. These returns are worthy of special notice.

Of vegetables, and articles of food, the entries were numerous. And the butter and cheese, those important farm-products, were well made, and indicated a highly commendable care and skill. To enumerate the household manufactures would be impossible in the short space allowed us; and to praise their appearance, would be only to repeat compliments which the farming community of Berkshire have so deservedly received for many years.

The quality of the cattle on exhibition was excellent, and in their shape and variety they indicated judgment and care in breeding. The oxen especially attracted our attention, as peculiarly fitted for farm-work, by their compact and well-formed structures, and for the shambles by their well-organized systems. There were also many well-made and conveniently-sized colts and horses.

The show of sheep was highly encouraging. It is evident that very considerable attention has been given here to the improvement of wool-bearing sheep within the last few years; and there were flocks on exhibition which might vie with some of the best in Vermont, or any other State, where the Merino is brought to high perfection. It appears that the hills of Berkshire are well-adapted to the feeding of the "improved American Merinos." The production of the heaviest fleece with the least amount of food in winter, and on pastures where heavy cattle and coarse-woolled mutton sheep would starve, is found to be a very profitable branch of agriculture, and it cannot be too strongly urged upon that section of the State, where this industry is already advancing. Farmers who have passed through the trials and disappointments which attend the breeding of French Merinos and Saxonies, and have learned that the Spanish Merino as developed in New England, is a hardy and profitable animal, have learned how to turn their pastures and their coarse fodder to the best account. They have obtained an animal which can bear our winters well, roams over our hills with natural aptitude, furnishes an ample return in wool during his life, and supplies the table with the choicest and cheapest-made mutton, when he is brought to the stall and the shambles. There are sheep whose sluggish and delicate organization requires constant pampering, and that luxuriance of feed which may be obtained on highly-cultivated fields, or in a stall well supplied with grain; and which are unfit for the toil of feeding on our steep and rugged hill-sides. There are undoubtedly localities in which they may be profitably fed. But let those who suppose that the Merino is a delicate animal which must be sheltered from every shower, remember the long journeys which he performs in his native mountains, and the exposure which he endures with impunity in every part of Europe, and in every section of the United States. Choice bucks and ewes, kept for the value of their blood, are carefully housed in order to exhibit their full capacity for growing strong and heavy fleeces—wool especially adapted to the most profitable branches of American manufactures—and not because the delicacy of their constitution requires it. So the breeder of Shorthorns, or Ayrshires, or Devons, or Herefords, endeavors, by shelter and careful feeding, to show the capacity of his animals, and to improve and develop those qualities which he desires to transmit with their blood; knowing as he does that the acquired faculties become at last a part of the nature which the breeding animal can hand down to his descendants.

We have seen the heavier breeds of sheep fond of the idleness and confinement of the farm-yard and slow to leave it. But not so of the Merino and some of the excellent mountain breeds of Wales and Scotland, to which we can appropriately apply the words of Bloomfield in his refreshing rustic poem, "The Farmer's Boy," where he says:—

> "For the luxuriant their grassy food,
> Sheep, long-confined, but loathe the present good,
> Bleating around the homeward gate they meet,
> And starve and pine with plenty at their feet.
> Loosed from the winding lane, a joyful throng,
> See o'er yon pasture, how they pour along."

It is this ability to roam which peculiarly adapts the Merino to our hilly lands, and which added to his heavy yield of wool and his easily fed carcase, makes him a profitable animal—the chosen sheep of Vermont, and Ohio, and New Hampshire, and Maine, and Illinois, and Texas,—the favorite of the best farmers in Virginia before that State was ravaged by war. The most important and growing industry of this last State which was broken up by the war, was the feeding of Merino sheep recently introduced by those farmers who appreciated the importance of this wool-growing animal.

We trust the farmers of Berkshire will not falter in the path upon which they have entered; and that their next exhibition will show as much perfection in this, as in the other branches of agriculture.

Geo. B. Loring.

HOUSATONIC.

The fair of the Housatonic Society was held on their grounds in Great Barrington, on the 28th, 29th and 30th days of September.

Necessary engagements elsewhere prevented my attendance the first day, an event that I regretted, as I learned on my arrival that the exhibition of all stock, excepting horses, is confined to that day, and the more, as the show in this department was said by those who witnessed it to have been very fine.

After making the acquaintance of some of the officers of the society, I learned from them that its condition continues to be flourishing, as, indeed, everything connected with the operations indicated.

There being, when I arrived, but little doing abroad, I made my examination of the hall. The first object that arrested my attention, so different from anything in those parts of the State, with which I am more familiar, was the magnificent display of butter; not in diminutive boxes of five pounds each, and those few in number at that, but in solid jars of twenty-five to fifty pounds, and not an inferior article, to judge from the appearance, in the whole. When I compared this artistic production, so indicative of the higher New England thought, and so connected with the refining influence of cultivated domestic life, with the coarse weed that covers so large a portion of the fertile lands bordering on the Connecticut, I could scarcely refrain from the feeling that the farmers of Berkshire tower aloft in the true spirit of their profession as far above those of my native valley, as her grand mountain peaks above our own smoke-producing plains.

Compare the two products together. They are the very opposites of each other. One suggests filth, the other cleanliness. The cultivation of the one brings the outer man into continued contact with worms and dirt, oftentimes defiling the conscience as well by laying it under continued protest, while its use is attended frequently with habits that set at defiance all attempts at sanitary reform. The production of the other, on the contrary, leads one to the fresh clover pastures where the bees sing. It takes you to the side of the motherly animal who offers you for the mere pressure of the hand, and the softer and cleaner the better, a production freighted with the aroma of nature's choicest compounds; then to the dairy-room, cool and sweet, and to the various processes which convert the flowing nectar into golden globules fit for the banquet of a king. Follow it now to its use, and you will see that it ministers to nothing but the legitimate wants of man; that it goes only where civilization and refinement go. It finds its place by the side of "the cup that cheers but not inebriates," making itself at once the crown and solace of the board. There were some fifty entries in this department, and I have no better wish for the exhibition than that for fifty years to come they may never exchange this wholesome product for the cultivation of a plant that is already "nigh unto cursing, and whose end is to be burned."

In my further examination of the hall, I found the usual variety of contributions, though of course they were not all of equal excellence, The Indian corn was fine; some specimens of twelve-rowed being equal to any I ever saw. This is no more, perhaps, than might be expected in a county which boasts the present season, a field of sixty acres in one body.

The exhibitions of vegetables was fair, but not remarkable.

In the department of fruit I noticed, particularly, fine specimens of peaches and grapes.. Of the latter an exhibition of ten varieties labelled "Thompson's Seedlings," particularly attracted my attention. Not having seen the exhibition, I can say nothing of their peculiar qualities, but, in appearance, they compared favorably with most of the seedlings that are now coming into popular favor.

The show of domestic manufactures was no way remarkable. I shall by no means attribute this to any want of industry or skill on the part of the fair women of Berkshire County, but rather to some of those untoward chances which sometimes attend the best efforts.

It is pleasant to see that among the fine tastes whose cultivation is on the increase among us, flowers are fast taking the place they so well deserve. The managers of the Housatonic Society are doing a wise thing in introducing them into the hall of exhibition. Their exact usefulness, indeed, it may be hard to define, because the impressions they make are evanescent and etherial like themselves; but there is no doubt that in the wise economy of Him who creates beauty for its own sake, and has given to man the answering faculty of admiration, certainly there *seems* to be no doubt that the grateful interchange of the two, tends only to the cultivation of those higher forms of social life which make the home radiant with beauty, and fragrant with the purest affections.

My observations out of doors were confined mainly to the ploughing-match which took place on the morning of the last day, and to sundry trials of the speed of horses on the track. The ploughing-match elicited the usual amount of interest, and showed commendable dexterity in this important art.

The trotting came off according to the programme, although the rain had put the track into bad condition. Your delegate is not a connoisseur in the sport, and therefore will not go into particulars. The most noticeable thing to him was the great good humor that prevailed in spite of the unfavorable circumstances. Having his own ideas of beauty in the horse, and the purposes for which he should be bred, he ventures the opinion, though with some fear of being thought heretical, that the attention given to the track of late, has not improved the style of our horses, or their quality for usefulness. We are losing the most valuable characteristics of the Morgans, compactness of frame, fine action, courage and endurance, and getting instead, the ungainly form and tender constitution of the racer.

I can only say, in conclusion, that, while the weather was most unfavorable for the festivities of the occasion, it seemed in no wise to damp the ardor and enthusiasm of the people who turned out in crowds, and whose tastes seemed so well-balanced that they were equally ready to pass judgment on a pen of cattle, to listen to a learned address, or to enjoy a two-forty trot.

To the officers, and others connected with the society, I tender my thanks for their many attentions.

T. G. HUNTINGTON.

HOOSAC VALLEY.

Agreeably to my appointment, I attended the fifth annual cattle show and fair of the Hoosac Valley Society, at North Adams, September 20 and 21, 1864.

The society have about twenty acres of land enclosed, upon which is a good track for the trial of horses, and a hall for the exhibition of the various articles contributed, costing about $1,500. The weather was fine, and the people were out in good numbers. The following is a list of the entries:

Articles in the hall, 249; agricultural crops, 108; fat oxen, 6; working oxen, 13 pairs; young stock, 11; two and three year old steers, 16 pairs; dairy and breeding cows, 8; milch cows and heifers, 8; bulls, 9; strings of cattle, 2; fine-wool sheep, 15 lots; coarse-wool do., 6 lots; flocks of 10 sheep, 3 entries; swine, 5 entries; poultry, 14 entries; matched horses, 14 pairs; single horses, 14; stallions, 6; breeding mares, 11; trotting horses, 3; three and four year old colts, 19; younger colts, 29. The cattle were exhibited the first day, with the exception of seven yokes of fine cattle from Lenox. The show of cattle was not as good as it should be.

No premiums are given for thoroughbred males, consequently some animals of that class, owned in the vicinity, were not at the show. I hope the society will take measures to bring out that important class of animals at their next annual show. I would also recommend to the society to increase their premiums on young stock, to encourage the raising of good animals. As a great many of our dairy farmers are in the practice of selling their milk, I would recommend two classes of premiums for milch cows—one for milk, the other for butter. There was no ploughing match and no trial of working oxen. Now, I would as soon judge of the merits of a fast horse, by examining him in the stable, as to decide upon the good qualities of a pair of working oxen while they were chained to a post. There was a town team from Florida containing some good cattle. A large portion of the cattle upon the ground were a cross with the Durham. In the hall there was a good exhibition of butter and cheese, and some samples of maple sugar that it would be difficult to excel; also some fine specimens of preserves, jellies, wines, &c. Some good vegetables, though the supply was not large. The fruit was exhibited in glass cases. Some fine pears were exhibited, but the apples (probably owing to the season) were not as good as usual. The manufactures of North Adams were well represented; also the fine arts, floral and fancy departments.

The second day was devoted to the show of horses. As many animals of that class are raised in the vicinity, much interest was manifested in that part of the show. The address, which was to come off on the afternoon of the second day, I cannot report upon, as I left about one o'clock, P. M. Good order prevailed during my stay. The officers of the society were active in their exertions to promote its interests; and in their politeness and hospitality did not forget the delegate from this Board.

Abel F. Adams.

NORFOLK.

The sixteenth annual fair of the Norfolk Agricultural Society, was held at Dedham on the 29th and 30th of September, 1864.

The first day was principally occupied in arranging the products in the hall for the full exhibition on the following day. The ploughing match came off on the first day. There were fifteen teams which competed for the premiums, most of them double teams. Some of them were made up of four horses, others of three horses, four of them with two horses, others with one yoke of oxen and one horse. They were such teams as the farmers used in working their land.

These teams differed materially from those which we see on similar occasions in Worcester County, where most of them are composed of a single pair of oxen, which are driven by the ploughman alone. It is not usual, at our cattle shows, to see fifteen teams at work for the awards.

These teams were all well trained, and performed their work with ease, and in the most finished manner.

The interest taken in this ploughing match, is a strong evidence that the people of this county will continue to cherish and support this branch of our State agricultural institutions, with all their zeal and efforts to which it is entitled.

During the first day the stock of various kinds was placed in the pens for the next day's exhibition. A spading match also came off, which I had not the opportunity of seeing. At noon a collation was provided in the upper hall, in true farmers' style, composed of the substantials of life, such as meat, bread, butter, and cheese. This was partaken of by about one hundred of those interested in the farmers' holiday.

All things were arranged for a grand display on the following day.

The expectations of a brilliant day, which was to come, were most decidedly dampened by the weather. It commenced raining about nine o'clock, and continued to pour down in torrents until late in the afternoon.

This bountiful rain, so much needed upon the dry ground, was not very acceptable to the guests, who could not be convinced that their clean dresses needed this showery ablution.

The display of fruits and flowers in the lower hall was unusually attractive.

The vegetables also were very plentifully exhibited, and in quality were all that could be expected in connection with the dryness of the season.

The exhibition of handicraft work, both useful and ornamental, has not been surpassed but by few in the State. Although the rain cut off the entertainment in the grounds, it increased the attention in the hall, which became most severely crowded. In fact, all that were able to procure admission, sought the hall for protection, not leaving a sufficient number in the field for picket duty.

Many were regretting the inability of Hon. Marshall P. Wilder (the president,) to be present. They were free to confess that he had been the life of the society. He did not, however, fail to send in his contributions for "exhibition only."

This one fact of the relation of Mr. Wilder to this society, affords a sufficient evidence of its importance and of its permanent continuance.

Although it appeared, at first view, that its principal corner-stone was removed by the illness of Mr. Wilder, quite as far as could be seen, the structure was not in the least shaken.

This society stands upon the industrious, skilful, and intelligent farmers of Norfolk County.

These farmers are booked up in their business. Many of them keep farm accounts, and are able to inform any inquirer, the cost of their productions, the market value, and the profits accruing therefrom.

These agriculturists, to me, were the most interesting portion of the exhibition, knowing that from casualties crops sometimes fail, but such intelligence never fails. A very slight examination during the rain, within the paling of the grounds, found a very fair display of neat stock and some splendid specimens of Cotswold sheep.

Soon after noon, the guests of the society assembled in the dining-hall to partake of the repast. Plates were laid for about six hundred, which were all occupied.

John Gardner, Esq., of Dedham, presided, who made some very pertinent remarks in relation to the discomfiture of the weather, but complimented the society upon the fullness of the exhibition.

Hon. Henry F. French, of Cambridge, favored the company with a very learned address in relation to the State Agricultural College.

Hon. George S. Boutwell spoke at some length on national affairs, expressing his confidence in the speedy return of peace, union, and prosperity, on a sound basis of *justice.*

Several other gentlemen followed by brief and pertinent remarks.

After the exercises at the table, the premiums awarded by the committee were announced.

Here, as in all other societies with which I have any acquaintance, I find an error in disposing of the premiums, which should be corrected.

It is in preferring monstrous growth and size to good quality and quantity, without consideration of the cost of production, or a profitable return for expenditures.

A monstrous Valparaiso squash, almost worthless, raised at great cost of manure, will often be admired by a committee and selected for the first premium on vegetable productions, setting aside the little excellent Hubbard for no other consideration than the enormous ponderosity of the former.

The same mistake frequently occurs in the premiums for pears.

Our pomologists will exhibit a dozen Flemish Beauty pears, the whole product of a single tree, some of them, perhaps, weighing eighteen ounces, all the others, which were set for growth upon the tree, having been removed for the purpose of producing this unnatural size.

Another fruit-grower will show the committee samples of the same kind of fruit of medium magnitude taken from a tree in equal condition, the product of which was one bushel. In most of such cases, the committee would favor the largest size. If twelve pears from one tree were sold for ten cents each, it would amount to $1.20. The sale of the bushel from the other tree would be cheap at $3. Certainly the bushel should be preferred for the prize.

This same admiration for monstrosities in magnitude is frequently noticed in the choice of some animals, particularly among those composing the *porcine* and *bovine* races. But I am pleased to say that it does not apply to horses and sheep.

These two races of animals have received more attention in breeding in this country than all others, and their qualities are better understood than any other production from the farm, and our New England may justly be proud that they are not equalled in excellence in any other part of the world.

The weight of our best blood horses, such as the Morgan and Blackhawk, is about ten hundred pounds. Ask any intelligent farmer how much he would like a horse to weigh. He will answer without hesitation, about ten hundred pounds.

This seems to be a question about which there can be no controversy, for the very reason that upon no subject of agriculture are the people so well informed.

Our best Infantado Merino sheep seldom exceed in weight one hundred and twenty-five pounds.

Would a committee well acquainted with the valuable qualities of sheep give a premium to one weighing two hundred pounds if half the surface of his skin was covered with hair, in preference to a small Merino with a perfect fleece? I think not, for the value of this animal is well understood.

I do not believe that any man of common capacity would wish for a sheep as large as a horse, or a horse as large as an elephant. We should be content with the construction within which nature has fixed the type of all animal and vegetable productions.

I trust that when we shall become better informed we shall be as well qualified to judge of the most perfect magnitude for all animal and vegetable productions, as we are now to fix upon the best and most perfect sizes for our horses and sheep.

Let this board protest against allowing premiums for any monstrosities either in animal or vegetable productions.

SAMUEL HARTWELL.

BRISTOL.

The Bristol County Agricultural Society held their forty-first annual exhibition on their grounds in Taunton, commencing on Tuesday, the fourth day of October, and continuing three days. Their grounds are sufficiently extensive to accommodate all classes of the exhibition, and ample space for the large assembly of people present on each day. They have a fine track, on which the horses are exhibited and the contestants try their speed. The ploughing was in the park, for competition, in which there were eleven entries of oxen, three of horses, and four of horse and steers. The ground was well adapted to it, free of stone, and the sward sufficiently strong to turn well. The work was generally well done; some of it, perfectly. All the competitors but two, used the double plough. The committee had regard to the manner, rather than the time, in which the work was accomplished, and although it requires longer time to perform the same work with the double plough, the better condition in which the soil is left for after cultivation amply compensates, where the ground is suitable.

The teams showed good training, and the ploughmen skill in managing them and guiding the plough.

Exhibition of town teams was next in course, of which two only were present—one from Raynham composed of thirty-eight yokes of cattle, the other from Taunton, consisting of thirty-six; in each were some good oxen.

The afternoon was devoted to the horse and the drawing of oxen and horses. There were two races announced by the programme for the afternoon, open to four-year-old colts only; the first to those owned in the county, with two prizes of $8 and $5; the other to all four-year-old colts owned in or out of the county, with a prize of $10. As usual, much time was taken up in preparing for, and getting a fair start.

For the drawing match, fifteen yoke of oxen and nine of steers, six pairs and eight single horses were entered. This part of the exhibition, though good, would have been better, had those in authority kept the spectators from pressing forward on the track, and so near in some instances as to interfere with the operation of the teamsters and their teams.

There were several fine pairs of horses, and some single ones that showed good training and great power in taking up the heavy loads to which they were attached.

The pens for the exhibition of stock, were some little distance from the trotting park, and seemed rather a side issue. The neat stock was not numerous nor did it seem to excite much interest or attention, yet there were some very good animals. The show of Shorthorns, numbering in all, old and young, twenty head, from the State Lunatic Asylum, was very good. Almost all the different breeds were represented by their sires, showing that the question, which is the most desirable, is not fully settled in Bristol County. In addition to the Durham stock from the asylum, Zenas B. Carpenter, of Attleborough, had a full-blood Devon bull; Thomas N. Dean, of Raynham, an Ayrshire; and E. G. Dean, of Taunton, an Alderney. Milch cows were exhibited by Charles Bissett, of Berkley, B. C. Godfrey, of Taunton, and Jason White, of Norton. There were also several grade heifers present, one owned by Benjamin Caswell, of Taunton, two years five and a half months old, which gave at that time ten quarts of milk per day.

I noticed but few fat cattle; but I saw two very fine pairs of steers well matched, one pair four and the other two years old. I did not learn the weight of the older, but the younger ones were said to weigh 2,400 pounds, and sold for $200, the others for $225. Both pairs were purchased by one man, and driven off the ground the first day. Of sheep, there was a creditable show. Charles T. Hazard, of Newport, exhibited two Southdown bucks, and George A. Hazard, of Newport, a Southdown and Leicester buck; S. H. Peckham, of Attleborough, had a very good show of sheep. Swine were scarce. I saw but four; two of these were exhibited by B. B. Wales, of Taunton; the pair, five months old, together weighed four hundred and thirty-five pounds.

Several horses and colts were exhibited. H. H. Freeman, of Norton, had two large two-year-old colts; George T. Bullock, of Taunton, two fine ones; and Isaac Ainsworth, of Fall River, quite a handsome one; there were also several others of good promise.

By way of curiosities, were two mountain goats, by Leonard L. Short, of Raynham; and an ass and her colt, by John T. Kelly, of Taunton. The ass, harnessed to a small vehicle and driven by a boy, attracted considerable attention.

The different varieties of poultry were very fully represented, with the exception of turkies, of which there was but one small coop—and of the different varieties there were some fine specimens.

Of geese, I never saw so great a variety at any show; I hardly know from what source it could have been increased. Among them were the wild goose, and one by William H. Dyer, of New Bedford, and caught by him some year or more since, swimming in the harbor with wings clipped; supposed to be of some African species.

Wednesday, the second day of the fair, was evidently the day of attraction. First, in the morning, was the grand procession of all stock offered for premium or exhibition, with the matched and family horses, which were out in goodly numbers and of good style.

At one o'clock, P. M., dinner was announced, and preceded by the Taunton Brass Band, a large number marched to the entrance of the society's building, and proceeded to the upper hall, filling every seat at the tables, spread through the entire hall. After the comforts of the inner man had been provided for, speeches were made in response to sentiments announced by the president. His Excellency, Gov. Andrew, first responded in a speech in his usual earnest and effective manner. Gen. Burnside also responded to a call and gave us an earnest of his hopeful feelings for the success of our country's cause. A poem prepared for the occasion, and read, closed this part of the entertainment.

It was very gratifying to see so many of the wives and daughters present, showing they too felt an interest in these festivals.

The exhibition in the hall was very attractive. That large room was filled with manufactures and products from Taunton and adjacent towns. William Mason, of Taunton, contributed largely of his manufactures and products, occupying a long table. Of these, were machinery of high finish for a locomotive, cotton machinery, and rifled muskets that looked as though they would, in good hands, do effective service; also a great variety of fruits and vegetables, consisting in part of forty-one varieties of pears, seven of grapes, and twenty-four varieties of potatoes; also choice flowers. C. Albro, of Taunton, exhibited one hundred and twenty-four varieties of agricultural products; Lemuel Short, of Taunton, ninety-six varieties; and H. G. Read, of Taunton, thirty-one varieties, including four crooknecked squashes of last year's growth. The show of apples was large and generally good—the different contributors exhibiting each from forty to eighty different varieties. W. R. Davenport, of Taunton, exhibited twenty varieties of pears; and N. S. Davis, of Somerset, fifteen of peaches. There was also a fine collection of cranberries by William King, of North Easton. I noticed on the tables three lots of quinces from different individuals, a variety of fruit rarely seen of late in most parts of this State; and of grapes, there was any quantity, and almost all varieties and good specimens. G. R. Goff, of Taunton, exhibited nine varieties of wine; and James Wood, of Taunton, two bottles of wine. I am unable to speak of the quality or give the name of the different varieties.

Bread, butter, and honey, a very good combination, were exhibited. George Prince, of Attleborough, exhibited six lots of beautiful-looking honey, in glass cases. Of the dairy products, there were eighteen lots of butter that looked very well, and ten of cheese, that I doubt not would taste well, though probably made where dairying is of minor importance. Bread puddings and pies were in profusion, showing, so far as the manufacture of these articles is concerned, the makers, if they are not already house-keeping, are fitted to do so. I saw bread made by a miss of twelve, and by a lady of ninety-eight years.

There was on exhibition gold and silver plated ware of beautiful style and finish. One case presented by Reed and Barton, of Taunton, contained one hundred and fifty-seven pieces. There were also Britannia ware, jewelry, time-pieces, cutlery, and hardware, woollen and cotton goods, boots, shoes, musical instruments, and in fact, every kind of manufacture from this manufacturing community. The domestic articles, both useful and ornamental, exhibited by the ladies, I could hardly enumerate; suffice it to say, that it was evident they had felt that their labors were required, and generously bestowed to render this part of the show perfect.

In the basement, carriages, implements of husbandry, consisting of mowing-machines, hay-tedders, horse-rakes, ploughs, harrows, feed-cutters, &c., were exhibited. And, in contrast to our modern plough, was one from Fayal by W. Chandler Hodges, Esq., of Taunton, of very unique appearance, hardly resembling a plough.

On Thursday, the third day of the show, notwithstanding the unpromising appearance of the weather, the people began to assemble in great numbers to witness the finale of the show.

The out-door attraction of the day was that noble animal, the horse, in his various movements, in walking, trotting, and running. The number of horses on the ground was probably less than it would have been, but for the National Horse Show, at Providence, on the same days.

I was under the necessity of leaving before the exhibition was through, but understand the close was very satisfactory; and that the receipts would very materially lessen the debt of the society, which by the energy of the officers and liberality of the people, as I was informed by the treasurer, had been within the last three years, reduced one-half or more.

Thus successfully closed the forty-first anniversary fair and cattle-show of Bristol County.

Hollis Tidd.

BARNSTABLE.

As the delegate of the State Board of Agriculture, I was present at the last exhibition and fair of the Barnstable Agricultural Society, held at Barnstable, Tuesday and Wednesday, October 4th, and 5th.

The weather was fine both days, and the gathering of the farmers and their friends a large one.

The arrangements were such as evinced on the part of the officers of the society, and the friends of agriculture, a zeal worthy of the cause, and the display of the various fold and dairy, gardens, orchards and fruit-yards, with the exhibition of the handiwork and fine taste of the ladies, were all creditable to the men and women of Barnstable County.

The fair was held on the grounds of the society, on which they have erected a strong, thoroughly-built, and splendid building, 100 feet by 60 feet. The lower story is for offices and the exhibition hall; the second story is a beautiful hall, used for lectures and addresses before the society; the building, as a whole, is one of the best for its purposes I have ever seen; the grounds contain fourteen acres, and, considering the peculiar shape of the land in and around Barnstable, the society have been fortunate in securing so good a place for their use.

The display of fruit, of various kinds, was a very good one, but what, more than anything else, drew my attention in this department, was the very fine exhibition of grapes and cranberries from Provincetown; the sands of Cape Cod here were made to bring forth in plenty most delicious fruits, by a system of earnest and generous culture. I have hardly ever seen anything to excel, if equal, this part of the exhibition. I cannot here give the names of those who have shown so much zeal and ability in this culture, but will say they are worthy of praise, and their example should be copied; the entries of fruit were good, and it was, to me, a very pleasing show.

The entries of vegetables were fine indeed; the display of garden produce could hardly be excelled. Some specimens from the "Bacon farm" were splendid, and were good witnesses of what can be done with liberal fertilization and generous culture.

The display of domestic animals was fair; the few cows and bulls were, however, of a good style and quality; the fat cattle were not numerous, but very good, and the working oxen were also very fine; these, with the 40 heifers, steers and calves, all of good quality, made a show which would have been creditable to a better growing district. There were but a few hogs or sheep, but the few were of good quality. The poultry-yard was well represented. In this as in the stock department, L. L. Goodspeed, Esq., held a prominent position.

The roads in Barnstable County are not such as would naturally elicit the sympathies of the sporting people in that vicinity; therefore the display of horses was not large.

The ploughing did not compare favorably, in my judgment, with that of some other societies; in part, perhaps, accounted for by the uneven surface and peculiarly hard soil. Not being a superior "ploughman" myself, suggestions to the farmers of Barnstable would be useless from me.

I noticed in the ladies' department, bread and gingerbread, which was in great abundance. Butter in excellent taste. Flowers also were beautiful. Fancy articles, too numerous to mention, were, as usual, well represented, and made a fine display. I was unable to remain to the close of the address, made by Judge Russell, of Boston, but left, with the assurance that, like all his efforts, it would be a success. There is every evidence in this society of health and strength, its officers and friends full of that earnestness which insures success, and promises that each year will add new interest to their fair, and perpetuate the annual farmer's celebration. I close this report with an acknowledgment of the kindness and courtesy of the officers of the society, and of George Marston, Esq., of Barnstable, to whom I am indebted for much kindness and hospitality.

S. JOHNSON.

NANTUCKET.

The ninth annual exhibition of the Nantucket Agricultural Society was held on the 27th and 28th days of September.

I arrived on the island on the 26th, and on my arrival was met on the boat by the worthy president of the society, (James Thompson, Esq.,) who kindly took me to his hospitable abode, and bountifully ministered to my wants. I am further indebted to him, and other officers of the society, for kind attention during the exhibition, and for rides about the island, which, to me, were very pleasant and interesting.

I was surprised to find so many thousands of acres of land lying wild and useless. I pictured in my mind the amount of wealth which might be realized by the land-owners, if these grounds, which are lying useless, could be stocked with sheep, now, when mutton is twenty-five cents per pound, and wool over one dollar. Without going into close estimates, I would say the amount would be *thousands* of dollars, almost all of which would be clear gain to the owners. In my opinion this is a subject well worthy the consideration of the inhabitants of Nantucket. I do not think the great natural agricultural resources within the limits of this society are properly understood.

I visited the farm of David Folger. I consider it the *model* farm of the island, as far as I had an opportunity to view. It shows by a little what much more might do, for there is plenty of land there, lying useless, which is just as good, naturally, as his. He cuts about three tons of hay per acre, has a good crop of corn; half an acre of Jackson White potatoes gave him one hundred and sixty bushels, or at the rate of three hundred and twenty bushels per acre. They were the finest looking specimens of this variety I ever saw. His mangolds, Swedes and carrots are as good as can be shown by any farmer in the Commonwealth. All the fertilizers used for the growth of these crops was a small quantity of animal manure, with the addition of kelp and sea-weed. He also has the best herd of cows I saw there, but I have one complaint to make against him,—he did not offer them for exhibition.

Certainly every *good* farmer, if a member of an agricultural society, should feel himself *bound* to exhibit all good stock, vegetables, or any other desirable product of his farm.

The weather was delightful on both days of the fair.

The first day was devoted to the examination of cattle, sheep and swine, the whole being enlivened by the North Bridgewater brass band. It was said the entries of stock at the grounds were more numerous than at some of the previous fairs. There were ninety cows and heifers, eight bulls, nine yokes of oxen and steers, six entries of sheep, and only one of swine. Among the cows and heifers were three pure-bred Jerseys, all fine animals; and among the bulls were two pure-bred Ayrshires.

The inhabitants of the island are indebted to the president of this society for his liberality, and praiseworthy perseverance in introducing those pure-bred animals for the improvement of the stock in future years. I am informed that Mr. Thompson has, of late, taken a good Ayrshire cow and heifer on to the island to add to his former enterprises.

The oxen were not remarkable, though thrifty and of fine symmetry.

Setting aside the two Ayrshire bulls, I have not much to say in favor of the remainder. The young stock on exhibition was a great improvement over the older animals, and I am informed the neat stock has improved at least thirty-three per cent. in quality since the incorporation of this society.

There were six entries of sheep, all grades, with the exception of one full-blooded Southdown buck, which was exhibited by George C. Gardner, Esq. The sheep on exhibition, and, in fact, all that I saw on the island, appeared uncommonly thrifty, and this is another word in favor of increasing sheep husbandry here.

The morning of the second day was occupied by the committees in the examination of breeding-mares and colts, of different ages, of which there were a large number on exhibition. In the afternoon the cavalcade formed in front of the bank, and, at two o'clock, started for the fair grounds, preceded by the band and a train of carriages, accompanied by a large crowd of people on foot, who soon made their way to their place of destination.

There was no test of speed, though there were several fine driving horses on the track, and skilful horsemanship was displayed.

Eight young ladies, each on a good saddle-horse, rode several times around the track, and I must say this was an interesting feature of the exhibition. I should be happy to see this part of the fair repeated by other societies, if it can be performed with as much propriety as on this occasion.

After this trial there came upon the track an elderly-looking gentleman and lady, seated on, what I should take to be, a worn-out war-horse. They rode on a pillion, and were dressed in the costume of ancient days. He with a high-crowned, white hat, tight-fitting coat and breeches, with large knee-buckles, white silk stockings, shoes and shoe-buckles, carrying a stick several feet long, which he flourished, to hasten the locomotion of their horse. The lady was dressed in a close-fitting brown silk dress, and a bonnet large enough to make a dozen after the fashion of the present day. In their antedeluvian costume they rode their steed steed several times over the track in front of the stand, to the great amusement of the crowd.

Vegetables.—The vegetables in the hall would do credit to any agricultural society in the Commonwealth, and I can safely say I have never seen better specimens exhibited in any State.

Fruit.—There were one hundred plates of pears, and about as many of grapes, all fine specimens of the best varieties, and a few plates of better quinces than I have seen for several years.

Butter.—There were six entries of butter, all so good and equal in quality that the committee were in doubt where to award the premiums.

Fancy Work.—The exhibition of fancy work was not as large as might have been expected, but the apology for the small amount offered was that the sanitary fair, held here a short time previous, had exhausted a large supply of such articles as would help to make a good show in this department.

Hall.—The hall was tastefully decorated with evergreens, and hung with appropriate mottoes, among which I noticed one upon the wall of the vegetable room, which read, "Nature's bounty, and man's industry, are alike the gifts of God." The hall was lighted both evenings, and was filled to overflowing with visitors. There was no formal address, and the time was agreeably passed in social intercourse, enlivened by the best of music on the first evening, by the band and singing, and the second, all were delighted with the vocal music by the Nantucket Glee Club.

The president tendered thanks to all who had in any way contributed to the success of this interesting and profitable exhibition. In conclusion, I am happy to say there appeared to be no want of enthusiasm to carry out successfully every department of the fair.

PAOLI LATHROP.

MARTHA'S VINEYARD.

The undersigned, a delegate from the State Board of Agriculture to visit the annual cattle show of Martha's Vineyard Agricultural Society, can say but little in relation to what was on the grounds the first day of the exhibition, for the reason that he did not arrive until the "day after the fair," for which mistake I feel very sorry, as I wished to note the progress of the society's efforts in improving the neat stock of the island. For several years past, the society have spent a part of their funds in buying thoroughbred Ayrshire bulls and taking them to the Vineyard for the purpose of improving their dairy stock. I think they have imported some five or six. These animals cannot but help to do a good work. The Ayrshire cow is an animal pre-eminently adapted for the dairy, with moderately short pastures. And I wish for the good of the farmers of the Vineyard that they had a stringent law forbidding the importation of, or the raising of any neat stock, except Ayrshires and their grades. This plan, strictly carried out for twenty or thirty years, would fill the island with a breed of cattle as uniform both in size and color as well as in the most useful qualities, as could have been imported from Scotland twenty or thirty years ago.

Sheep husbandry is an important branch of agriculture on all the islands of this district. They have wisely, as I think, adopted a mutton breed. They are quite uniform in size and color, resembling the Leicester breed, although smaller than the improved breed now known as the new Leicesters, but, in my judgment, about large enough for their keeping. I think a few Southdown rams introduced among their flocks, would thicken the fleece, and add one or two cents per pound to the value of the lambs for the market, and increase the value of the whole flock in a considerable degree. The sheep as well as the cattle will pay for more care than they now receive on the island.

The introduction of the Spanish Merinos, to a small extent, was made some two or three years since; but they have not proved satisfactory. The fact of it is, the Spanish Merino sheep is a fancy animal. The sheep, after a few months old, is said to be very hardy, and with the care which they receive I have no doubt but they are; yet the newly born lamb is exceedingly delicate, and requires more care than a novice in fine-wool sheep can comprehend, in so short a time as they have been on the island. The *modus operandi* of the Vermont Merino breeder is very nearly as follows:

Winter Treatment.—Warm stables and warm sheds, with fresh water always at hand; the best of hay, with roots and corn, or oats every day; when the early lambing season commences, a warmed room night and day, with a new milch cow, and the flock-master ever at hand. As soon as the lamb is dropped, the mother and lamb are brought into the nursery, and if the mother has no milk at the time, which is often the case, the lamb is fed on warm milk and molasses for a day or two, when the mother will generally have milk, when the lamb is taught to nurse its dam. In this way, some of the most careful flock-masters succeed in rearing ninety out of one hundred lambs dropped.

Summer Treatment.—The best of pastures, with wheat bran and oats, generally every day; a shower, and not even a dew is allowed to fall on them; in fact, they are handled in this respect, very much as a lady handles her dress bonnet. In this way they will shear eight pounds of unwashed wool on the average; and instances are on record of twenty-five pounds of unwashed wool from a sheep weighing only one hundred and twenty-five pounds. This seems fabulous; but I have no doubt of the fact, neither have I a doubt that when this same fleece was fitted for the cards, it would not weigh much over four pounds. But just so long as they can find purchasers at from fifty to three hundred dollars apiece, with now and then one that will bring from one to two thousand dollars, it will pay to bestow all this care and expense on them; but how long these prices will be sustained remains to be seen.

The culture of the cranberry is increasing on the island, and with excellent results; and every piece of ground suitable should be planted with them at once. They do pay now and always will.

I should recommend a more extended cultivation of the grape; it seems to me that the island is excellently well adapted to grape-culture. I could not learn of but one probable drawback, and that was the prevailing south winds of the summer, which I learn, blow with great force, and might injure the foliage, if not protected by a belt of trees or something of the kind. But if it should prove that these winds are not a material drawback, it will pay well either to sell the fruit in the market or to make it into wine. The grape requires but little manure, compared with pears, tobacco, or vegetable gardening. None of the large towns of New England will ever get grapes enough at five or six cents per pound, and at that price they can be raised and pay a good profit. I would recommend a trial of the Concord, the Diana, the Catawba, and Isabella; these are well known sorts, and will ripen on the island in great perfection.

The display of apples was good, but the number of varieties was small. The most prominent kind was a variety that probably originated on the island,—they call it the "Pignose." I do not find it described in my books; it resembles in form, color, and taste, somewhat the Yellow Bellflower, and is a valuable variety for the island. The following varieties of apples I should think would succeed as well as the "Pignose":

Summer.—Red Astrachan and Sopsavine.

Autumn.—Mother and Gravenstein.

Winter.—R. I. Greening, Peck's Pleasant, Ladies' Sweeting, Tolman's Sweeting, and Yellow Bellflower, and probably a much larger list; it is a well known fact that apples succeed the best that originate near where they are cultivated.

The display of pears was good but small, only showing that they can be cultivated on the island with success.

Among the fine displays of field crops and garden vegetables I noticed very fine onions, and a valuable white turnip, and hard-shell pumpkins, in great perfection. The climate, it is claimed, has the effect to produce this variety.

The butter on exhibition in the hall was of a very fine color, but most of it was too salt to suit the taste of an epicure, and needlessly salt to keep well.

The farmers of the Vineyard have somewhat neglected the cultivation of the soil for the, perhaps, more lucrative farming of the ocean. But, gentlemen of the Vineyard, now that petroleum has, in a measure, cut off your fat voyages after the leviathan of the deep, you will have more leisure to cultivate the beautiful land of your birth, and with the dearest market in the world in close proximity, you can't help but grow rich, and make the island a vineyard in truth as well as in name. My hearty thanks are due to the officers and members of the society for kind attention and hospitality.

HENRY R. KEITH.

RETURNS

OF

AGRICULTURAL SOCIETIES,

FOR 1864.

Finances.

SOCIETIES.	Amount received from the Commonwealth.	Income of the permanent fund.	New members and donations.	All other sources.	Receipts for the year.	Premiums offered.	Premiums and gratuities paid.	Current expenses — not including premiums and gratuities — for the year.	Disbursements for the year.	Indebtedness.	Value of real estate.	Value of personal property.	Permanent fund.
Massachusetts, . .	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex, ...	$600 00	$604 32	$126 00	$462 25	$1,666 55	$1,292 00	$603 25	$1,097 67	$1,700 92	-	$6,000 00	$1,900 00	$7,688 45
Middlesex, ...	600 00	102 50	220 00	609 05	1,531 55	744 00	548 75	772 02	1,320 77	-	3,000 00	2,000 00	5,000 00
Middlesex North, .	600 00	-	103 00	768 71	1,471 71	799 00	437 50	975 98	1,742 07	$740 00	6,614 94	665 69	7,280 63
Middlesex South, . .	600 00	24 00	78 64	760 20	1,462 84	984 00	469 00	694 99	1,163 99	2,400 00	7,200 00	1,500 00	8,700 00
Worcester, ...	600 00	-	155 00	2,115 00	2,870 00	1,211 25	835 42	1,188 60	2,024 02	5,500 00	18,000 00	600 00	13,100 00
Worcester West, . .	600 00	389 89	36 00	127 50	1,153 39	745 00	496 34	229 87	993 69	100 00	-	5,248 21	3,897 46*
Worcester North, . .	600 00	334 09	120 00	497 14	1,551 23	1,223 75	790 58	592 81	1,383 39	-	-	5,329 79	5,129 79
Worcester South, .	600 00	247 52	78 00	101 00	1,026 52	767 25	492 23	403 65	895 88	-	2,300 00	1,855 00	4,155 00
Worcester South-East,	600 00	184 78	74 00	615 08	1,473 86	1,073 50	507 37	818 72	1,526 09	-	-	3,852 10	3,852 10
Hampshire, Franklin and Hampden,	600 00	240 00	37 00	1,330 49	2,367 49	-	483 95	976 58	1,555 53	3,250 00	8,500 00	4,000 00	9,250 00
Hampshire, ...	600 00	582 85	67 50	256 97	1,507 32	774 00	504 50	566 11	1,070 26	-	4,500 00	275 00	4,500 00
Highland, ...	600 00	93 54	98 00	361 00	1,152 54	649 00	444 00	626 99	1,086 49	-	2,300 00	1,800 00	4,100 00
Hampden, ...	600 00	-	15 00	1,233 57	1,848 57	†	-	1,614 83	1,614 83	9,400 00	32,150 00	800 00	22,750 00
Hampden East, . .	600 00	234 00	124 75	38 00	996 75	810 00	362 00	389 87	752 13	1,094 00	4,000 00	941 00	4,000 00
Franklin, ...	600 00	80 90	1,253 00	699 60	2,633 50	854 00	642 25	661 60	2,620 85	1,000 00	7,500 00	1,100 00	6,000 00

Housatonic, . . .	$600 00	$652 27	$62 00	$1,823 44	$3,137 71	$896 00	$827 25	$1,860 26	$2,687 51	$832 00	$8,000 00	$100 00	$8,000 00
Berkshire, ...	600 00	619 00	160 00	2,093 37	3,472 37	1,674 75	1,541 75	1,165 59	3,307 34	-	12,000 00	500 00	12,000 00
Hoosac Valley, . .	600 00	100 00	351 00	842 04	1,888 04	845 00	639 75	579 51	2,323 38	2,500 00	6,000 00	125 00	3,500 00
Norfolk, ...	600 00	-	59 00	1,387 25	2,046 25	1,787 00	460 00	2,294 35	2,754 35	7,100 00	10,414 00	-	5,614 00
Bristol, ...	600 00	-	80 00	4,432 40	5,112 40	1,878 50	1,266 50	1,425 00	2,691 50	7,500 00	23,041 58	800 00	16,341 58
Plymouth, ...	600 00	506 00	375 00	2,400 07	3,881 07	1,487 50	1,019 77	1,087 58	3,986 17	2,266 06	19,500 00	1,714 53	19,462 00
Barnstable, ...	600 00	45 00	60 00	411 95	1,116 95	715 00	434 19	568 72	1,002 91	500 00	7,000 00	300 00	6,800 00
Nantucket, ...	520 00	213 49	40 00	205 50	976 99	804 00	337 00	575 73	736 02	-	3,000 00	500 00	3,500 00
Martha's Vineyard, .	600 00	490 94	143 04	255 88	1,489 86	607 50	‡	378 56	1,089 07	850 00	3,440 93	2,483 34	5,924 27
Totals, ...	$14,320 00	$5,745 09	$4,015 93	$23,827 46	$47,835 46	$24,822 00	$14,143 35	$21,535 39	$41,929 26	$45,032 06	$194,461 45	$38,389 66	180,545 28

* In addition to which, Society holds notes of individuals for $248.86 temporarily; cash in hands of Treasurer, $641.89; cattle pens, &c., valued at $460.

† Merged with New England Fair.

‡ $348.67 awarded, to be paid after January 1st, 1865.

Permanent Fund—How Invested.

Essex.—In bank stock, railroad bonds, and notes.

Middlesex.—In notes with security, bank and railroad stock, and cash.

Middlesex North.—In land, buildings, and personal estate.

Middlesex South.—In land, buildings, pens and fixtures, and notes receivable.

Worcester.—In real estate.

Worcester West.—In U. S. bonds, note of Barre Boot Company, notes, cattle pens and fixtures, and cash.

Worcester North.—In U. S. bonds, bank stock, notes, cattle pens and fixtures, and cash.

Worcester South.—In hall, furniture in hall, cattle pens, fixtures and storehouse, loans with security.

Worcester South-East.—In notes, pens, and furniture.

Hampshire, Franklin and Hampden.—In bonds and mortgages, and notes secured.

Hampshire.—In hall and grounds.

Hampden.—In lands and buildings.

Highland.—In real estate, mortgage on real estate, U. S. Treasury Notes, loans, notes and cash.

Hampden East.—In real estate and endorsed notes.

Franklin.—In real estate and bank stock.

Berkshire.—In real estate.

Housatonic.—In real estate and notes.

Hoosac Valley.—In real estate.

Norfolk.—In real estate occupied by the Society.

Bristol.—In farm and buildings, including trotting park and avenue.

Plymouth.—In real estate. furniture, and cash in treasury.

Barnstable.—In land and buildings, cattle pens, &c.

Nantucket.—In fair grounds and track, with improvements and conveniences for stock; also two pure blood Ayrshire bulls, and U. S. bonds.

Martha's Vineyard.—In hall and land, fixtures, and notes secured.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED.

For Farms, Farm Improvements, Manures, &c.

SOCIETIES.	For management of farms.	For draining.	For subsoiling.	For ploughing at the Exhibition.	For reclaiming swamp lands.	For experiments with manures.	For spading.	For hedges and ornamental trees.	For reclaiming old pastures.	For orchards of all kinds.	For cranberries.	For other farm improvements.	Total amount offered for farm improvements.	Total am't awarded for farm improvements.	Total amount actually paid for farm improvements.
Massachusetts,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Essex,	$30 00	–	–	$69 00	$15 00	$15 00	–	–	–	–	–	–	$632 00	$129 00	$120 00
Middlesex,	–	–	–	34 00	–	–	–	–	–	–	–	–	169 00	34 00	34 00
Middlesex North,	–	–	–	26 00	–	–	–	–	–	–	–	–	–	26 00	–
Middlesex South,	–	–	–	40 00	–	–	–	–	–	$14 00	–	–	230 00	54 00	54 00
Worcester,	–	–	–	60 00	–	–	–	–	–	–	–	–	56 00	60 00	45 22
Worcester West,	–	–	–	45 00	–	–	–	–	–	–	–	–	190 00	45 00	45 00
Worcester North,	–	–	–	49 00	–	–	–	–	–	–	–	–	235 00	71 00	64 00
Worcester South,	–	–	–	29 00	–	–	–	–	–	–	$1 00	–	206 25	30 00	30 00
Worcester South-East,	–	–	–	41 00	–	–	–	–	–	–	–	–	234 00	41 00	–
Hampshire, Franklin & Hampden,	–	–	–	–	10 00	–	–	–	$10 00	–	3 00	–	–	–	–
Hampshire,	–	–	–	–	–	–	–	–	–	–	–	–	56 00	–	–
Highland,	–	–	–	–	–	15 00	–	–	–	–	–	–	33 00	15 00	15 00
Hampden,	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hampden East,	–	–	–	16 00	–	25 00	–	–	–	–	50	–	198 00	41 50	41 50
Franklin,	–	–	–	–	–	–	–	–	5 00	6 00	–	–	26 00	10 50	10 50
Berkshire,	–	–	–	48 00	11 50	10 00	–	–	–	21 00	–	–	110 50	96 50	96 50
Housatonic,	–	–	–	38 00	15 00	–	–	–	–	18 00	–	–	84 00	71 00	71 00
Hoosac Valley,	–	–	–	–	–	–	–	–	4 00	5 00	–	$15 00	–	24 00	24 00
Norfolk,	–	–	–	80 00	–	–	$15 00	–	–	–	6 00	–	586 00	101 00	86 00
Bristol,	–	–	–	75 00	–	–	–	–	–	–	6 00	–	343 00	81 00	81 00
Plymouth,	–	–	–	48 00	–	25 00	4 00	–	–	–	–	–	150 00	77 00	165 00
Barnstable,	–	–	–	20 00	–	10 00	–	–	–	5 00	–	–	73 00	35 00	35 00
Nantucket,	–	–	–	4 00	–	–	–	–	–	–	–	–	109 00	4 00	4 00
Martha's Vineyard,	–	–	–	6 00	–	15 00	–	–	–	8 00	9 25	5 75	143 00	44 00	†
Totals,	$30 00	–	–	$728 00	$51 50	$115 00	$19 00	–	$19 00	$77 00	$25 75	$20 75	$3,863 75	$1,090 50	$1,021 72

* Merged with the New England Fair.

† Paid after January 1, 1865.

For Farm Stock.

SOCIETIES.	For Bulls.	For Milch Cows.	For Heifers.	For Calves.	For Working Oxen.	For Steers.	For Fat Cattle.	For Horses.	For Sheep.	For Swine.	For Poultry.	All other Stock.	Total amount offered for Live Stock.	Total am't awarded for Live Stock.	Total amount paid out for Live Stock.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	$16 00	$8 00	$16 00	$4 00	$30 00	$15 00	-	$54 00	$15 00	$13 00	$10 00	-	$325 00	$181 00	$176 00
Middlesex,	10 00	27 00	5 00	2 00	15 00	-	$10 00	89 00	-	32 00	10 00	$90 00	334 00	290 00	290 00
Middlesex North,	31 00	67 00	23 00	-	23 00	11 00	16 00	55 00	10 00	30 00	19 00	33 00	385 00	291 00	202 00
Middlesex South,	35 00	38 00	10 00	-	22 00	5 00	13 00	69 00	21 00	22 00	39 50	-	324 00	274 50	267 50
Worcester,	13 00	36 00	29 00	-	54 00	52 00	20 00	467 00	46 00	30 00	17 00	173 00*	903 00	929 00	659 00
Worcester West,	30 00	50 00	16 00	22 00	35 00	22 00	23 00	101 00	10 00	26 00	4 00	-	451 00	339 00	292 00
Worcester North,	36 00	38 00	35 00	30 00	20 00	42 00	31 00	128 00	24 00	14 00	9 75	25 00	504 00	407 75	393 25
Worcester South,	21 00	15 00	8 00	6 00	29 00	14 00	6 00	48 00	41 00	15 00	7 50	30 00	389 00	240 50	240 50
Worcester South-East,	22 00	25 00	10 00	17 00	28 00	16 00	-	92 00	6 00	27 00	7 50	-	335 50	250 50	-
Hampshire, Franklin & Hampden,	26 00	15 00	19 00	5 00	53 00	13 00	15 00	163 00	22 00	19 00	6 00	101 00	568 00	457 00	285 50
Hampshire,	16 00	7 00	11 00	13 00	24 00	17 00	12 00	180 00	9 00	7 00	5 00	48 00	368 00	349 00	339 50
Highland,	16 00	20 00	12 00	5 25	23 00	17 50	9 00	106 00	34 00	5 00	3 00	47 00	410 75	297 75	297 75
Hampden,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hampden East,	27 00	13 00	14 50	-	23 00	18 00	5 00	65 00	19 00	18 00	5 00	30 00	280 00	237 50	237 50
Franklin,	55 00	18 00	14 00	15 50	23 00	53 50	-	192 00	82 80	22 00	4 50	55 50	542 50	535 80	513 00
Berkshire,	56 00	39 00	30 00	9 00	45 00	38 00	25 00	350 00	120 00	25 00	29 50	70 00	896 00	836 50	836 50
Housatonic,	17 00	32 00	20 00	6 00	35 00	26 00	13 00	113 00	51 00	21 00	10 00	21 00	394 00	365 00	365 00
Hoosac Valley,	19 00	19 00	5 00	5 00	24 00	15 00	5 00	143 00	41 00	14 00	17 00	116 00	423 00	311 00	307 00
Norfolk,	26 00	73 00	20 00	-	12 00	5 00	-	151 00	30 00	34 00	32 00	-	547 00	383 00	271 00
Bristol,	60 00	63 00	29 00	8 00	90 50	38 00	37 00	360 00	29 00	13 00	29 50	-	720 00	757 00	757 00
Plymouth,	38 45	85 00	27 00	23 00	30 00	15 00	42 00	208 00	46 00	22 00	23 00	-	604 00	559 45	358 30
Barnstable,	15 00	7 00	11 00	7 00	18 00	10 00	50 00	47 00	14 00	9 00	17 00	-	270 00	205 00	205 00
Nantucket,	35 00	24 00	19 00	-	14 00	-	-	59 00	26 00	5 00	9 50	-	341 00	191 50	191 50
Martha's Vineyard,	11 00	5 00	2 50	1 25	6 00	6 75	20 00	19 00	24 50	14 00	5 50	-	144 25	115 50	†
Totals,	$631 45	$704 00	$386 00	$179 00	$676 50	$449 75	$352 00	$3,259 00	$721 30	$437 00	$320 75	$839 50	$10,459 00	$8,804 25	$7,484 80

* Awarded for sweepstakes to all herds.

† Premiums paid after January 1, 1865.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Continued.

For Farm Products.

SOCIETIES.	Indian Corn.	Wheat.	Rye.	Barley.	Oats.	Beans.	Grass Crops.	Grass Seeds.	Potatoes.	Carrots.	Beets.	Parsnips.	English Turnips.	Ruta-Bagas.	Onions.	Other Root Crops.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	$10 00	$8 00	-	-	-	-	-	-	-	-	-	-	$8 00	-	-	$28 00
Middlesex,	3 00	-	$1 00	$1 00	-	-	-	-	$2 00	$2 00	$5 00	$3 00	-	-	$2 00	14 00
Middlesex North,	25 00	-	-	-	-	-	-	-	-	-	-	-	-	$5 00	-	24 50
Middlesex South,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37 00
Worcester,	2 00	4 00	4 00	1 00	$1 00	$1 00	-	$4 00	1 00	2 00	1 00	1 00	1 00	1 00	-	30 00
Worcester West,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worcester North,	2 00	-	-	-	-	3 25	-	-	3 50	-	1 25	-	75	-	-	18 51
Worcester South,	26 00	-	-	-	-	-	-	-	-	2 00	2 00	-	-	-	-	-
Worcester South-East,	17 00	-	-	-	-	-	-	-	4 00	4 00	-	-	-	-	5 00	-
Hampshire, Franklin & Hampden,	30 00	14 00	7 00	-	-	-	-	14 00	8 00	4 00	4 00	-	-	-	-	-
Hampshire,	4 00	1 00	1 00	-	1 00	-	-	1 00	1 00	-	-	1 00	1 00	-	1 00	3 00
Highland,	4 00	-	-	-	-	5 00	$5 00	50	7 00	-	-	-	2 00	-	-	-
Hampden,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hampden East,	50	1 25	-	-	75	2 00	-	-	75	-	-	75	80	75	-	1 25
Franklin,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Berkshire,	30 00	21 00	21 00	14 00	21 00	7 50	12 00	3 00	28 00	6 00	6 00	-	6 00	6 00	-	46 50
Housatonic,	35 50	16 00	15 00	12 00	14 00	3 00	-	11 00	15 50	7 00	50	-	6 00	-	1 00	10 00
Hoosac Valley,	15 00	14 00	8 00	10 00	15 00	5 00	-	5 00	12 00	-	5 00	-	3 00	-	-	-
Norfolk,	-	-	-	-	-	-	-	-	5 00	-	-	-	-	-	-	-
Bristol,	36 00	-	-	-	-	6 00	-	-	-	-	-	-	-	6 00	-	6 00
Plymouth,	32 00	11 00	-	7 00	4 00	-	-	-	10 00	-	-	-	-	-	-	-
Barnstable,	10 00	3 00	-	-	5 00	-	-	-	5 00	-	-	-	5 00	-	-	-
Nantucket,	28 50	-	-	-	-	-	5 00	-	7 50	1 50	2 75	-	-	-	-	-
Martha's Vineyard,	32 75	3 50	2 25	-	5 00	1 75	9 00	-	4 00	50	1 50	-	1 00	-	2 25	-
Totals,	$343 25	$96 75	$59 25	$45 00	$66 75	$34 50	$31 00	$38 50	$114 25	$29 00	$29 00	$5 75	$34 55	$18 75	$11 25	$218 76

Farm Products—Concluded.

SOCIETIES.	Total amount offered for Grain and Root Crops.	Total am't awarded for Grain & Root Crops.	Total am't paid for Grain and Root Crops.	Broomcorn Brush.	Fruits.	Flowers.	Any other cultivated Crops.	Milk.	Butter.	Cheese.	Honey.	Wheat Bread.	Rye and Indian Bread.	Corn Bread.	Total am't paid out under the head of Farm Products.
Massachusetts,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Essex,	$147 00	$34 00	$34 00	-	$83 25	$22 00	-	-	$14 00	$14 00	-	$3 00	-	$5 00	$182 00
Middlesex,	41 00	33 00	33 00	-	85 00	15 00	-	-	20 00	-	-	11 00	$3 00	-	167 00
Middlesex North,	137 00	54 50	13 50	-	93 75	-	-	-	14 00	-	-	12 00	6 00	-	-
Middlesex South,	92 00	-	-	-	52 25	15 00	-	-	16 00	-	$15 00*	9 00	5 50	-	149 75
Worcester,	62 00	62 00	27 50	-	-	-	-	-	35 00	30 00	-	10 25	8 00	-	83 50
Worcester West,	55 00	-	-	-	23 00	10 00	$12 00	-	10 00	23 00	-	6 00	6 00	-	83 00
Worcester North,	74 00	34 00	34 00	-	64 75	9 04	8 50	-	14 50	2 25	4 50	4 50	4 00	-	160 80
Worcester South,	50 00	30 00	30 00	-	41 25	6 00	34 65	-	9 00	9 00	1 53	12 00	6 00	-	149 43
Worcester South-East,	90 00	30 00	-	-	66 50	10 25	27 00	-	6 00	6 00	5 75	7 00	4 50	-	-
Hampshire, Franklin and Hampden,	101 00	21 00	16 50	-	44 75	19 00	12 00	-	10 00	6 00	5 00	3 00	1 50	1 50	83 50
Hampshire,	99 50	15 00	15 00	-	25 50	13 00	2 00	-	11 00	6 00	3 00	3 50	7 00	3 50	88 50
Highland,	80 00	33 50	33 50	-	12 75	2 00	13 25	$3 50	6 50	5 00	1 50	75	75	75	70 25
Hampden,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hampden East,	96 95	34 75	34 75	-	10 75	3 25	-	-	5 00	5 00	1 00	1 00	50	2 00	58 50
Franklin,	42 50	7 85	7 85	-	49 75	16 10	-	-	10 25	6 00	12 50*	5 00	3 50	3 50	97 35
Berkshire,	281 50	228 00	228 00	-	35 00	10 00	-	-	25 00	31 00	6 00	3 00	3 00	3 00	344 00
Housatonic,	206 50	146 50	146 50	-	33 00	13 00	23 00	-	15 00	19 00	4 00	1 50	1 50	1 50	257 00
Hoosac Valley,	182 00	97 00	97 00	-	22 00	10 50	5 00	-	10 00	17 00	6 00	3 00	1 50	1 50	168 50
Norfolk,	137 00	7 00	3 00	-	46 00	26 00	-	-	26 00	8 00	3 00	15 00	5 00	-	100 00
Bristol,	248 00	54 00	54 00	-	93 00	13 00	40 00	-	25 00	23 00	15 00	6 50	4 00	14 00	287 50
Plymouth,	127 00	74 00	-	-	97 75	40 25	4 00	-	21 00	21 00	1 25	5 75	5 75	-	282 00
Barnstable,	87 00	28 00	28 00	-	26 00	13 20	-	-	8 00	7 00	-	6 00	6 00	6 00	100 20
Nantucket,	147 00	37 00	37 00	-	39 75	11 25	-	-	10 00	-	-	-	-	-	98 00
Martha's Vineyard,	115 75	63 50	†	-	19 50	4 75	10 44	-	16 00	3 00	1 25	1 50	1 50	1 50	†
Totals,	$2,699 70	$1,124 60	$873 10	-	$1,065 25	$282 59	$191 84	$3 50	$337 25	$241 25	$86 28	$130 25	$84 50	$43 75	$3,010 78

* Sundries.

† Premiums, &c., paid after January 1, 1865.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Concluded.

Miscellaneous.

SOCIETIES.	Amount awarded for agricultural implements.	Amount offered for the raising of forest trees.	Amount awarded and paid out for the same.	Amount offered for experiments on manures.	Amount awarded for all other objects, strictly agricultural.	Amount awarded for objects other than agricultural.	Number of persons who received premiums and gratuities.
Massachusetts,	-	-	-	-	-	-	-
Essex,	$19 00	$30 00	-	$25 00	-	$123 00	-
Middlesex,	5 00	-	-	60 00	-	52 75	181
Middlesex North,	5 00	-	-	-	-	56 50	-
Middlesex South,	13 50	105 00	-	25 00	-	93 50	189
Worcester,	-	22 00	-	-	-	47 50	158
Worcester West,	2 00	30 00	-	70 00	-	60 00	190
Worcester North,	18 00	50 00	-	60 00	$134 85	134 85	240
Worcester South,	-	35 00	-	75 00	-	72 80	139
Worcester South-East,	-	30 00	-	60 00	-	-	211
Hampshire, Franklin and Hampden,	-	20 00	-	-	10 00	108 50	203
Hampshire,	7 00	15 00	-	30 00	-	48 50	217
Highland,	-	-	-	-	-	61 00	156
Hampden,	-	-	-	-	-	-	-
Hampden East,	14 00	25 00	-	73 00	-	38 86	203
Franklin,	29 00	10 00	-	9 00	-	46 25	198
Berkshire,	34 50	-	-	-	110 25	126 00	360
Housatonic,	15 00	-	-	30 00	-	101 25	246
Hoosac Valley,	-	-	-	30 00	-	163 00	247
Norfolk,	20 00	31 00	-	75 00	-	38 00	143
Bristol,	-	105 00	-	60 00	-	144 00	273
Plymouth,	-	*	-	60 00	-	201 47	343
Barnstable,	5 00	7 00	-	-	-	81 99	201
Nantucket,	-	13 00	-	12 00	-	100 00	164
Martha's Vineyard,	7 25	18 00	-	60 00	19 99	39 99	135
Totals,	$194 25	$546 00	-	$814 00	$275 09	$1,939 71	4,397

* $60 payable in 1866, and $100 payable in 1868.

NAMES of the Cities and Towns in which resided the persons when receiving the Premiums and Gratuities awarded by the County Societies; and the several amounts as disbursed.

ESSEX.

Amesbury,	$1 50	Lynnfield,	$0 50
Andover,	41 00	Marblehead,	29 00
Boston,	10 00	Methuen,	50 00
Bradford,	34 00	Middleton,	31 50
Boxford,	16 75	Newbury,	29 00
Danvers,	13 00	North Andover,	53 75
Essex,	2 75	Salem,	74 50
Georgetown,	8 00	South Danvers,	26 50
Groveland,	4 50	Topsfield,	7 00
Haverhill,	14 00	West Newbury,	72 00
Lawrence,	125 00	Total,	$647 25
Lynn,	3 00		

MIDDLESEX.

Acton,	$38 75	Feltonville,	$1 00
Bedford,	10 25	Framingham,	16 00
Belmont,	32 50	Lexington,	27 25
Billerica,	1 00	Lincoln,	36 00
Burlington,	2 00	Medford,	4 00
Cambridge,	16 00	North Reading,	5 00
Carlisle,	8 25	Reading,	1 00
Chelmsford,	16 00	South Reading,	3 00
Concord,	133 75	Stow,	24 00
Dracut,	8 00	Sudbury,	14 00

MIDDLESEX—Concluded.

Waltham,	$37 25	Wilmington,	$13 00
Wayland,	19 00	Woburn,	30 00
Weston,	33 75	Worcester,	2 00
West Cambridge,	16 00	Total,	$548 75

MIDDLESEX NORTH.

Acton,	$0 50	Reading,	$6 50
Billerica,	11 00	Stoneham,	75
Chelmsford,	139 25	Tewksbury,	60 75
Dracut,	26 50	Tyngsborough,	53 50
Dunstable,	105 00	Westford,	13 00
Lowell,	141 50	Wilmington,	21 50
Pepperell,	6 00	Total,	$585 75

MIDDLESEX SOUTH.

Ashland,	$15 87	Sherborn,	$13 25
Framingham,	350 34	Southborough,	8 00
Holliston,	4 50	Sudbury,	27 99
Hopkinton,	4 00	Wayland,	51 25
Marlborough,	27 25	Total,	$585 44
Natick,	82 99		

WORCESTER.

Auburn,	$3 00	Boylston,	$1 00
Barre,	67 00	Charlton,	20 00
Blackstone,	6 00	Dudley,	6 00
Bolton,	7 00	Fitchburg,	100 00

WORCESTER—Concluded.

Grafton,	$68 75	Spencer,	$2 00
Holden,	27 00	Sturbridge,	43 00
Millbury,	65 00	Sutton,	90 00
New Braintree,	13 00	Westborough,	29 00
Oakham,	8 00	West Boylston,	24 00
Oxford,	4 00	Worcester,	422 75
Rutland,	7 00	Total,	$1,136 00
Shrewsbury,	25 50		

WORCESTER WEST.

Barre,	$303 88	Paxton,	$0 50
Bernardston,	3 00	Palmyra,	1 00
Boston,	2 00	Petersham,	9 75
Charlton,	22 00	Phillipston,	7 50
Hardwick,	23 00	Rochester,	75
Hubbardston,	19 50	South Danvers,	2 75
New Braintree,	67 00	Syracuse,	25
North Brookfield,	8 00	Templeton,	7 25
Oakham,	6 75	Total,	$494 88

WORCESTER NORTH.

Ashburnham,	$10 00	Leominster,	$40 50
Ashby,	8 00	Littleton,	10 00
Bolton,	10 00	Lunenburg,	69 50
Boston,	1 00	Princeton,	124 00
Fitchburg,	420 35	Royalston,	18 00
Leicester,	50	Shirley,	10 62

WORCESTER NORTH—Concluded.

Sterling,	$3 25	Woonsocket,	$5 00
Townsend,	37	Worcester,	8 00
Westminster,	24 49	Total,	$790 58
Winchendon,	21 00		

WORCESTER SOUTH.

Brimfield,	$49 05	Southbridge,	$91 65
Brookfield,	23 15	Spencer,	6 25
Charlton,	101 50	Sturbridge,	137 88
Dudley,	38 50	Warren,	36 00
Middlefield,	25	Total,	$492 23
Oakham,	8 00		

WORCESTER SOUTH-EAST.

Auburn,	$3 00	Mendon,	$113 50
Bellingham,	9 25	Milford,	255 70
Blackstone,	1 00	Northbridge,	4 00
Douglas,	2 00	Sutton,	4 00
Grafton,	2 00	Upton,	20 50
Holliston,	22 50	Uxbridge,	20 00
Hopkinton,	34 00	Westborough,	32 00
Medway,	13 25	Total,	$536 70

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Amherst,	$1 00	Deerfield,	$12 00
Chesterfield,	4 50	Easthampton,	10 00
Chicopee,	12 00	Goshen,	6 00

HAMPSHIRE, FRANKLIN AND HAMPDEN—CONCLUDED.

Hadley,	$39 50	Springfield,	$16 00
Hatfield,	33 00	Sunderland,	19 50
Northampton,	221 70	Ware,	2 00
South Hadley,	50 75	Westhampton,	6 00
Shelburne,	22 00	Williamsburg,	11 00
Southampton,	9 00	Total,	$475 95

HAMPSHIRE.

Amherst,	$218 00	Leverett,	$16 00
Belchertown,	18 50	Montague,	1 00
Boston,	1 00	Northfield,	75
Granby,	1 00	Pelham,	14 75
Greenfield,	9 00	South Hadley,	1 00
Hadley,	96 90	Sunderland,	43 25
Leyden,	1 00	Total,	$422 15

HIGHLAND.

Becket,	$66 25	North Adams,	$0 75
Chester,	35 25	Northampton,	19 25
Chicopee,	5 00	Peru,	45 25
Cummington,	3 00	Pittsfield,	50
Dalton,	7 50	Sandisfield,	7 00
Hinsdale,	80 75	Springfield,	50
Huntington,	5 25	Washington,	11 25
Lanesborough,	3 25	Windsor,	50
Lee,	5 00	Worthington,	12 00
Middlefield,	135 75	Total,	$444 00

HAMPDEN EAST.

Brimfield,	$0 00	Wales,	$00 00
Holland,	00 00	Ware,	00 00
Ludlow,	00 00	Wilbraham,	00 00
Monson,	00 00	Total,	$00 00
Palmer,	00 00		

FRANKLIN.

Bernardston,	$4 00	Monroe,	$1 00
Charlemont,	3 50	Montague,	16 75
Colerain,	31 50	Northfield,	11 00
Conway,	51 25	Orange,	15 00
Deerfield,	83 00	Shelburne,	254 00
Erving,	8 00	Sunderland,	27 50
Gill,	21 50	Warwick,	2 00
Greenfield,	159 30	Whately,	4 50
Leverett,	7 60	Total,	$722 90
Leyden,	21 50		

BERKSHIRE.

Adams,	$82 00	Hinsdale,	$36 50
Alford,	4 00	Lanesborough,	203 00
Becket,	54 50	Lee,	86 50
Cheshire,	47 25	Lenox,	197 50
Curtisville,	7 00	Monterey,	1 50
Dalton,	20 50	New Ashford,	4 00
Great Barrington,	19 00	New Marlborough,	5 00
Hancock,	4 50	Peru,	11 00

BERKSHIRE—CONCLUDED.

Pittsfield,	$458 75	Tyringham,	$4 00
Richmond,	15 50	Washington,	5 00
Sheffield,	31 50	Williamstown,	72 25
South Adams,	61 25	Windsor,	7 75
Stockbridge,	102 00	Total,	$1,241 75

HOUSATONIC.

Alford,	$29 25	New Marlborough,	$38 00
Becket,	11 50	New Lebanon, N. Y.,	1 00
Cheshire,	4 50	Pittsfield,	4 00
Egremont,	106 50	Richmond,	15 00
Great Barrington,	177 50	Sandisfield,	7 00
Hillsdale,	3 00	Sheffield,	168 25
Lee,	52 00	Stockbridge,	83 75
Lenox,	80 00	Tyringham,	7 00
Monterey,	25 25	West Stockbridge,	7 50
Mount Washington,	3 25	Total,	$827 25

HOOSAC VALLEY.

Cheshire,	$38 00	Pittsfield,	$3 00
Clarksburg,	15 00	Pownal, Vt.,	19 00
Florida,	33 75	South Adams,	115 00
Hinsdale,	8 00	Stamford,	8 00
Lanesborough,	4 00	Williamstown,	128 00
Lenox,	35 00	Total,	$639 75
North Adams,	233 00		

NORFOLK.

Braintree,	$1 00	Needham,	$128 85
Brookline,	18 00	Quincy,	3 00
Canton,	12 00	Randolph,	8 50
Dedham,	180 00	Roxbury,	3 75
Dorchester,	35 25	Sharon,	8 00
Dover,	42 40	Stoughton,	41 00
Foxborough,	12 00	Walpole,	11 50
Franklin,	31 00	West Roxbury,	68 00
Medfield,	9 50	Weymouth,	5 00
Medway,	23 25	Wrentham,	18 00
Milton,	25 00	Total,	$683 00

BRISTOL.

Attleborough,	$20 00	Raynham,	$182 00
Berkley,	24 25	Rehoboth,	68 75
Dighton,	5 50	Seekonk,	5 00
Easton,	41 50	Somerset,	4 25
Fairhaven,	25	Swansey,	18 50
Fall River,	18 50	Taunton,	543 50
Mansfield,	19 25	Towns out of the County,	115 00
New Bedford,	11 75	Total,	$1,266 50
Norton,	188 50		

PLYMOUTH.

Abington,	$11 25	East Bridgewater,	$99 50
Bridgewater,	448 52	Halifax,	46 00
Carver,	20 00	Hanson,	2 00
Duxbury,	75	Kingston,	9 75

PLYMOUTH—CONCLUDED.

Lakeville,	$37 70	Plympton,	$11 25
Marshfield,	6 50	Rochester,	9 25
Mattapoisett,	50	South Scituate,	2 00
Middleborough,	163 10	Wareham,	1 40
North Bridgewater,	105 00	West Bridgewater,	113 70
Pembroke,	8 25	Total,	$1,163 17
Plymouth,	66 75		

BARNSTABLE.

Barnstable,	$378 32	Sandwich,	$24 00
Dennis,	4 00	Yarmouth,	17 00
Orleans,	7 62	Total,	$434 19
Provincetown,	3 25		

NANTUCKET.

Nantucket,	$393 50

MARTHA'S VINEYARD.

Chilmark,	$110 79	Tisbury,	$194 08
Edgartown,	43 80	Total,	$348 67

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ABSTRACT OF RETURNS

OF THE

AGRICULTURAL SOCIETIES

OF

MASSACHUSETTS,

1864.

EDITED BY

CHARLES L. FLINT,

SECRETARY OF THE STATE BOARD OF AGRICULTURE.

BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
No. 4 Spring Lane.
1865.

PREFACE.

The returns of the various agricultural societies were more meagre this year than usual, added to which many of them failed to get their Transactions printed in season to make it practicable to use them in making up the following Abstract.

I have, also, condensed that part of the returns which were received in time, somewhat more than usual, so as to bring the size of the volume to reasonable limits, even at the risk of leaving out some topics that might have appeared under other circumstances.

I must again urge upon the societies the importance of greater promptness in publishing their returns, and of putting them into a shape that will secure them a more careful study on the part of farmers into whose hands they happen to fall. The money invested in printing is the most judicious expenditure a society can make, and they cannot fully and honorably discharge their duty to the State without incurring this expenditure.

C. L. F.

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1865.

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Secretary—CHARLES P. PRESTON, of Danvers.

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Secretary—JOHN B. MOORE, of Concord.

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Secretary—JAMES W. BROWN, of Framingham.

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Secretary—JOHN D. WASHBURN, of Worcester.

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Secretary—WILLIAM W. GALLUP, of North Adams.

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MARTHA'S VINEYARD.

President—JOHN PIERCE, of Edgartown.
Secretary—DANIEL A. CLEAVELAND, of West Tisbury.

AGRICULTURAL EXHIBITIONS.

The Exhibitions of 1865 *begin* on the following days :—

Essex, at *Lawrence*,	Tuesday, Sept. 26th.
Middlesex, at *Concord*,	Thursday, Sept. 21st.
Middlesex North, at *Lowell*,	Thursday, Sept. 28th.
Middlesex South, at *Framingham*,	Tuesday, Sept. 19th.
Worcester, at *Worcester*,	Thursday, Sept. 21st.
Worcester West, at *Barre*,	Thursday, Sept. 28th.
Worcester North, at *Fitchburg*,	Tuesday, Sept. 26th.
Worcester South, at *Sturbridge*,	Thursday, Oct. 5th.
Worcester South-East, at *Milford*,	Tuesday, Sept. 26th.
Hampshire, Franklin and Hampden, at *Northampton*,	Thursday, Oct. 5th.
Hampshire, at *Amherst*,	Tuesday, Sept. 26th.
Highland, at *Middlefield*,	Thursday, Sept. 14th.
Hampden, at *Springfield*,	Tuesday, Oct. 3d.
Hampden East, at *Palmer*,	Tuesday, Oct. 10th.
Franklin, at *Greenfield*,	Thursday, Sept. 28th.
Berkshire, at *Pittsfield*,	Tuesday, Oct. 3d.
Hoosac Valley, at *North Adams*,	Tuesday, Sept. 19th.
Housatonic, at *Great Barrington*,	Wednesday, Sept. 27th.
Norfolk, at *Dedham*,	Thursday, Sept. 28th.
Bristol, at *Taunton*,	Tuesday, Oct. 3d.
Plymouth, at *Bridgewater*,	Thursday, Oct. 5th.
Barnstable, at *Barnstable*,	Tuesday, Oct. 3d.
Nantucket, at *Nantucket*,	Tuesday, Sept. 26th.
Martha's Vineyard, at *W. Tisbury*,	Tuesday, Oct. 17th.

AGRICULTURE OF MASSACHUSETTS.

AGRICULTURE AND THE INDUSTRIAL ARTS.

From an Address before the Essex Agricultural Society.

BY DARWIN E. WARE.

We have assembled to celebrate in the county of Essex the annual fair and festival of its farmers. The season is felicitous. The delightful coolness of the morning and evening hours; the genial, warm-hearted noons; the clear and crystalline air, in which the heavens seem higher, the pure sky bluer, the fleecy clouds whiter and the radiance of the night more silvery than their wont, are grateful and exhilarating after the sultry heats of summer. The wistful, anxious days are ended. The perils of the germinating seed and the tender plant are over. The crop has passed beyond the power of the worm, the insect and the drought, and now lies safely mellowing for the harvest. Upon the foliage of the forests glow here and there the streaks of many-colored light, that soon will blaze with golden and crimson splendors in the sunset of the declining year. They herald the approaching hour of thanksgiving, when the farmer rests from his labors.

The occasion is one of universal interest. When the farmers rejoice, let all men make holiday. The least thoughtful perceives that all alike are indebted to him who grows the crop for the sustenance of their daily lives. The more reflecting, to whom the present brings up the past from which it came, as the sea-shell vibrates to the listening ear with the roar of its far-off ocean home, passes, in thought, from the farmer's herds in the enclosures of the fair-ground back on the line of the centuries, over the slow migrations from the East, upon which these faithful animals have been the indispensable companions and servants of our race, and finds in the associations of the day the spirit of a hoar antiquity. Cattle of their kin went with Israelites through the divided waters; they trod the threshing-floors of Judea; they were the flocks the shepherds tended, who saw the risen star of Bethlehem.

It is not, however, so generally considered that agriculture, from the necessity of fixed habitations to which it gives rise, is the foundation of our civilization. The permanent home which agriculture establishes marks the civilized man; with this comes the stable social order, the civil polity, the sentiment of country, the record of history, the gathering accumulations of progress by successive generations and the durable architecture of religion and the state. No roving race could build the Pyramids or the Parthenon. The ancient Greeks, habitually contrasting their condition with that of the wandering Scythians of the North, well knew the ground of their preëminence, and venerated Demeter, the divine genius of agriculture, as the founder of civilization. What wonder, then, that on the days of her high festival, a people proud of their beloved Athens, the sculptured city of ancient Grecian art, and filled with the patriotism that fought at Marathon, should, with the greatest fervor of devotion, throng the precincts of her temple, and with primal rites of sacrifice and stately pomp of solemn ceremonies, honor her, who was the mother of their pride and joy!

This lofty plane of life the race has never left. And here, to-day, in the new world of the West, in the nineteenth century of our Lord, beneath a roof dedicated to Christian worship, and mindful of our common country, we render hearty thanks to the only living and true God, for the grand old art upon which the towering fabric of our social being enduringly rests.

But agriculture is not the only art of civilized society. Perhaps, indeed, at this stage of human advancement, it is not to be considered as the art that gives to our most modern life its distinguishing characteristics. There are arts upon which even agriculture greatly relies—the arts of mechanical and manufacturing industry. The farmers of Essex are met at Lawrence, one of the principal and busiest centres of this industry in our county. I am sure I interpret their feelings rightly, when I acknowledge the generous social and official hospitality which has been extended to them. Permit me in most of the observations I shall present to you, to prolong the courtesy of this acknowledgment, by considering in some of its phases the dependence of agriculture upon the arts to which this city is devoted. In suggesting the dependence of agriculture, let me not seem to derogate from its just praise. On the contrary, the highest dignity is claimed for it in the assertion of its greatest dependence. The place of loftiest elevation is dependent upon all below that sustains it. Agriculture is the highest art only by virtue of its power of making all the other arts and industries subservient to itself. "The glorious privilege of being independent," of which the poet sings, is a moral not a social independence. Let the farmer rejoice in this privilege, and in the many circumstances of his life by which the virtue also is nourished. The philosophy, however, that claims for the farmer's vocation, and as a ground of especial congratulation, that it makes him independent of society and the aid of his fellow-men engaged in other employments, is based upon a mistake of fact and an erroneous conception of the principles of human progress. What can be more unfounded in fact? The farmer contracts with the carpenter and mason for his house and barn; he buys his furniture, clothing, meat, flour, implements, frequently his bread, butter, cheese and grain; and from the islands of the Pacific, material is brought in ships to fertilize his lands. Probably there is not a farmer in Massachusetts who could keep himself alive, by farming on his present system, without drawing upon external resources. It is with the farmer as with other classes of men, his advancement in his vocation is proportionate to the extent he is aided by other employments. The advancement of society is always marked by increasingly diversified mutuality of social dependence. This is the law of progress. It is but the manifestation, in the larger relations of life, of the principle of the division of labor, that in proportion as men become civilized, their pursuits should be diversified. The traditional ascription to the farmer of a peculiar social independence is derived from a state of society existing in Massachusetts, within the recollection of persons here present, when the wool and flax grown by him were spun and woven into garments by his household, and the crops were mainly consumed on the farm upon which they were raised. But independence like this is the independence of an undeveloped social life; one that is still found, though in a ruder form, in the log cabins upon our western frontier; one that increases as man departs from civilization, and reaches its extreme limit in the American Indian and the African Hottentot. The higher the organization of social life, the more each works for all and all for each, and in so doing each works most efficiently for himself; the deeper and tenderer, too, becomes the sentiment of a common humanity that pervades all classes.

It was agriculture that established the fixed condition of life, and the possibility of the minute division and distribution of employments. But mechanical and manufacturing industry, when thus established as a distinct department of labor, reacts at once upon agriculture, and gives it a new and rapid development. It creates the demand for a surplus of food to sustain the mechanic, who no longer supplies himself. As the proportion of society devoted to agriculture diminishes, its efficiency must be strengthened. From that surplus of food beyond his own wants which he raises for the new industry, he improves his own condition, and increases the productiveness of his own labor by better implements. He becomes able to devote himself exclusively to the raising of crops, and leaves to the mechanic and manufacturer to do for him, what they are able to do with greater skill, and at less cost. The progress of agriculture, until within a short period of time, has been the effect almost exclusively of improved implements, and consequently has directly depended upon the progress of mechanical art. Until the mechanic has fashioned the tools with which the farmer can clear of its stubborn and luxuriant growths the soil best fitted for him, the mould of the valley and the plain, he is compelled to work on the poorest land, because least obstructed by vegetation. The development of the capabilities of the soil by culture at increasing depths, is measured by the difference between the sharpened stick of the farmer drawn through the earth and leaving a shallow scratch one or two inches deep, and the iron plough of the mechanic exhibited here to-day, which gouges a furrow to the depth of eight inches or stirs to the depth of fifteen inches, the subsoil. A deeper culture is equal to a larger extension of arable surface. Under the effects of such mechanical improvements, the globe of agriculture dilates with multiplied dimensions. From the sickle to the reaping and mowing machine, from the trampling oxen and the flail to the threshing machine, from the unaided palm of the sower to the drilling machine, from the slow-picking fingers of the slave to the cotton-gin, from the hand-hoe to the horse-hoe and hoeing machine, from the hand-rake to the horse-rake, from the basket borne upon the head, or the back of an animal, or the market-wagon, to the railroad train drawn by the locomotive engine, we have similar gradations of mechanical progress followed by the enhanced productiveness of the farmer's labor. But for these improved implements, most of which, in their American manufacture, supply a world-wide demand, the crops of Europe and America could not be planted, raised, gathered or distributed, and their populations must suffer and perish for lack of food. The last census in a single fact represents in its enormous magnitude the accumulated contribution which mechanical art makes to the resources of American agriculture. The tables of the last census prove that in the ten years over which its reckoning extends, an addition was made to the improved land of the country of fifty million acres. The whole improved land of the United States amounts to one hundred and sixty-three million acres. In the ten years from 1850 to 1860 agriculture subdued to itself an extent of territory very nearly one-half as large as that of the whole improved land that had resulted from the farming of the country since its first settlement.

Agriculture and the farmer have received not only these advantages, but they have shared the benefits of the general movement which has attended the progress of the mechanical arts, and improved the condition of society. The mechanic and the manufacturer have won the first great triumphs under that leader of the race who raised the standard of dominion over nature, as the rightful realm of man. The spoils they win, however, are divided with all. They cannot contrive a mode by which the enhanced productiveness of their industry, shall not redound to the common weal. The million man-power of machinery can be wielded only for mankind. No single class can appropriate its capacity for human aggrandizement. No system of caste, or serfdom, or slavery can make sycophants of steam or electricity. They acknowledge no sovereignty but that of the people—the sovereignty of man. The engines of mechanical force are the great democratizers of states. What makes Massachusetts so preëminently a democratic commonwealth? It is the fact, that a social power produced by mechanical art, and equivalent to a hundred million men, is distributed among the million and a fifth of her actual population, and diffuses through the whole mass, the inspiration of a larger personality, and a more aspiring manhood. The development of her new industries, and the revival that stirred the hearts of her people so deeply, and reëstablished in her institutions on a firmer basis, the principle of universal education, were contemporaneous, and under the auspices of the same public men.

The social power of mechanical and manufacturing production in England, is the keen and watchful rival of the aristocracy. Under the lead of Cobden, and to give the mechanic cheaper food, it abolished the corn laws, which protected the privileged class and the culture of their immense estates. To-day, it demands through John Bright, legislation that shall liberalize the tenure of land; and with the sanction of Gladstone, England's future prime-minister, seeks an extension of the suffrage. The student of nations, who follows through the last forty years the policy of Russia in developing her mechanical and manufacturing industry, is prepared to understand how such statesmanship should culminate in the thunder-flash of that emancipating edict which made twenty-three million serfs, freemen.

The history of mechanical progress shown in one implement of agriculture, the plough, contains in epitome the history of man's contest with nature, and his ascent to civilized supremacy. A hafted wooden tooth, drawn through the ground by a shaft, and leaving but a slender superficial groove, is the rudiment. It is held and drawn, with painful, exhausting toil, by slaves. With the ploughshare, the coulter, the mould-board, the two handles, and the yoked oxen come the deeper and broader gauge of the furrow, relief to the overtasked ploughman, and a free yeomanry. The polished instrument of iron, with the bended beam, and nicely balanced adjustment of weight, lines, curves and angles, with which its parts are put together, and which slides through the glebe with such easy guidance in your ploughing match, carving and turning the curling sod without a break, represents a five-fold gain in effectiveness over the plough of eighty years ago. It represents, besides, an industry more profitable and less laborious, the liberation of the mind from the cramping bonds of an overworked physical fibre; it represents the farmer who is taught in the school, who reads, and writes, and thinks, who owns his land, and makes the government. And depend upon it, this same human creature who has dragged the plough, and held the plough, and driven the oxen, will not rest content until he puts steam into the yoke, seats himself on the plough's back, and ploughs the earth at his ease.

The mower of our day is the happy type of an age ameliorated by mechanical art. The portraiture of Time that fancy gives us is out of date. Keep the hour-glass. We cannot get rid of that. But picture him no longer as the gaunt old man who has worn the flesh from off his bones in cutting swaths with an old-fashioned scythe, but rather as the well-conditioned farmer, mounted upon his chariot-machine, driving his team afield through the falling grass, to the ringing music of the clipping blades.

Labor-saving machinery alone, however, cannot insure a true progress in agriculture. That involves many elements. Unlike the mechanical and manufacturing arts, the product of agriculture is not a fabricated, but a natural one. It is a living plant. Art here can only aid the vital organic force. It may improve the species by mixture and by culture, it may multiply the crop, but it cannot construct a plant out of its constituent elements. The principles of vegetable growth upon which agriculture depends, are among the subtlest, most veiled, and intricate of the operations of nature. They lie in the shadowy region that borders upon the thick, impenetrable darkness that shrouds the mystery of life. That region, however, has been explored, and the exploration has disclosed for the first time in the history of the race, intelligible principles that inspire the hope of an agriculture progressive and productive almost without limit. The objection does not now apply which Lord Bacon brought against the works on agriculture to which he had access. A large collection of them, which he owned, he caused to be piled up in the courtyard and set on fire; because, said he, "In all these books, I find no principles; they can, therefore, be of no use to any man." What the law of gravitation is in astronomy, what steam is in mechanics, what the Constitution of the United States is in government, the beginnings of epochs, such is the newly developed science of chemistry, in agriculture. That light and heat from the sun, that water, air and earth were necessary to vegetation, was understood. Experience had shown that certain crops were better adapted to some soils than to others; that a succession of different crops was better than a succession of the same crops; that fallows increased the vegetative power of the land. These, and such as these empirical rules, were known and obeyed; and yet, in spite of husbandry of this sort, crops would in time deteriorate, and the soil lose its virtues beyond the skill of the farmer to devise the means of restoration. The writings of Columella and Varro, while they disclose a system of Roman husbandry, most careful, methodical and painstaking, at the same time reveal the appalling, irremediable fact, that the production per acre had largely diminished. Filled with the ancient faith that the golden age of the race was in its prime, and that then the arts were divinely established in their perfection, the Roman farmers dreamed that a declining agriculture was due to some lost charm, some missing precept, which tradition had failed to transmit down the course of the centuries from hero-ancestors taught by the gods. Modern agriculture has exhibited the same stages of decadence. But modern science has revealed the causes of such decline and placed within the control of man the powers that will enable him to resist this downward tendency, if he will but use them. Earth, air and water have been resolved into their priomordial elements. A searching analysis has shown what essentials of its life and substance the plant draws from the soil, and what from the atmosphere. The microscope has revealed the complex physiology through which by a subtle alchemy the sun in the heavens converts the mineral earth, and air and water, into an organic growth that is food for the nations. Among the most valuable generalizations of science is the demonstrated truth that certain known constituents of the soil do in the process of vegetable growth, enter into the essential constitution of the plant, and as a consequence, that these constituents are removed from the soil in the removal of the plant of which they form a part. These indispensable substances of the soil compose but a very small portion of its bulk, and they are not replaced by any process of nature, certainly not by any process rapid enough to keep pace with the succession of crops. To restore the conditions of vegetation, they must be replaced by man. Every crop diminishes the capacity of the land for the production of another crop. This diminution may not be perceptible in its immediate influence upon a virgin soil, rich in the necessary elements of vegetation. Years, even generations, may elapse before these mineral deposits shall seem to fail. Rotation in the crops will equalize the drain upon the different portions of the soil. The yearly agitations of the plough will bring to the roots of the plant other particles of earth whose virtues have not been extracted, and the steady action of the sun upon the changing surfaces exposed to its rays, will develop new resources of vegetative power. These and other causes will postpone the day of exhaustion. That day, when it comes, is one of wrath, of ruin and desolation for the work of civilized man. The imposing fabric moulders, crumbles and falls. The fertile plain, once waving with bountiful harvests and sustaining populous and well-built cities, becomes a barren waste. The blasted fields of ancient agriculture are to-day monuments of the vengeance which nature wreaks upon a culture that does not compensate the soil. The Roman Campagna was once the garden of Italy from which the millions of the imperial metropolis drew daily supplies of food. Here was the site of the luxurious country-seat, the splendid villa, the estate of the Roman senator. Here were purple vineyards, and rolling landscapes covered with golden grain. Here, too, were temples of the gods. Now, a noisome desert exhales a poisonous miasma and affords the prowling robber a lurking place in its tangled growths. Only here and there, where a squalid peasant has fixed his hovel, can a sign of human habitation be seen. Not the Campagna alone in Italy, and not Italy alone of the ancient states, exhibits the ravages of the despoiling husbandman. The Etrurian coast, Calabria, Asia Minor, the islands and continent of Greece, bear constant testimony to the desolating power that exists in a vicious agriculture. With the extension of Roman sway and the inadequacy of Roman farms to supply the demand for food, the fertile lands of Sicily, Sardinia and the Mediterranean coasts of Africa, became tributary to the granaries that fed the Roman populace, and the inevitable curse of spoliation smote them too with sterility.

And to-day, while the historian recounts the stages through which Rome passed, from a social condition in which a sturdy yeomanry were largely owners and tillers of the soil, and the strength of the state in war and peace, one in which a Cincinnatus could pass from his plough and four-acre farm to the dictatorship, charged to see that the republic should receive no detriment, and from the dictatorship back to the modest farm wearing the crown of gold, after he had vanquished the foe and saved his country,—and then comes down to the time when the Gracchi strove unto death, but in vain, to recruit by a distribution of the public domain the diminishing farmer-class, and rescue them and their salutary power from the encroachments of an aristocracy of capitalists and patricians,—and so still further on to the period of over-grown estates tilled by slaves, of a yeomanry impoverished, of pauperism massed and accumulating, of the few hugely rich, and of the multitude poor, dependent and corrupt, till Cæsar comes, and Caligula, and the invading Vandal, with the manners, morals, and events of their respective times, down to the doomed and irretrievable fall,—while the the historian recites this melancholy story of a risen and fallen empire, the man of modern science reads, date by date, the parallel record of the waning fertility of an unrequited soil, traces the tendency of deteriorating lands to become aggregated in large estates, to yield themselves exclusively to servile labor, to degrade the farmer, to swell the proletarian mob, to induce the necessity of an outlet for population, and of gaining new resources of food by war and conquest,—and so weaves an argument that startles if it does not persuade us, that the various chapters of this tale of glory and decline, are illustrations of the natural laws of agriculture and a warning for all time. To his mind, one Liebig had been worth an hecatomb of Gracchi to save the Roman state.

To no people should the warnings of science, pointing to the ruins of the past, come with more power to impress with serious alarm than to our own. For there is no people upon the face of the earth that would achieve greatness, that prosecutes an agriculture more wasteful, improvident and reckless of the indispensable conditions of an enduring fertility of the soil. We have ravaged the continent like an enemy's territory. With the axe and with fire we have hewn down and burned away the primitive growths of the valley, the hillside and the prairie. Crop by crop, we have drawn from the earth its precious minerals, and borne them hundreds and thousands of miles to distant cities, across the continent, over the ocean, and never returned again, them or their equivalents; until at last, exhausted of its treasures, it refuses longer to yield the abundant harvest of its prime, and lapses through successive stages of deterioration into impoverishment, unfruitfulness, and sterility. The failing crop, instead of stimulating the American farmer to seek a remedy in an improved system of culture, too often prompts him to abandon the lands he has reclaimed from the wilderness, and sends him out in search of fresh fields and pastures new, on which to repeat the process of devastation. From New England, he migrates to New York, from New York to Ohio and Wisconsin; and now Ohio complains of abandoned farms and of migrations to the West. Under this system, while with the increasing acreage brought under cultivation, the aggregate product of the country has immensely increased, lands which half a century ago were unsurpassed in productiveness, and seemingly inexhaustible, have visibly deteriorated. Whole States have been impoverished. In our own Commonwealth, the average of the crops of corn, wheat, rye, barley, oats and hay, was quite low in 1807, but it was some fifteen per cent. lower in 1855. In New York, where the average crop of wheat eighty years ago was from twenty-five to thirty bushels, it is now only fourteen bushels per acre. Ohio, which eighty years ago presented to the farmer a rich unbroken soil in the wild state of nature, now yields a diminishing average per acre of twelve bushels of wheat. In 1850, the average yield of wheat per acre did not exceed seven bushels in Virginia and North Carolina, and five bushels in Alabama.

It is a well authenticated fact, that of the one hundred and sixty-three million acres of improved land in the United States, three-fourths receive no return of the necessary elements of vegetable growth that are carried off by the annual harvest. A distinguished agriculturist calculated in 1850, the annual waste of these elements to be equal to the mineral constituents of fifteen hundred million bushels of corn, and that the amount of only two of these elements thus lost in a single year, was worth at their market price, twenty million dollars. "To suppose," says the author of these estimates, "that this state of things can continue, and we, as a nation, remain prosperous, is simply ridiculous. We have as yet much virgin soil, and it will be long ere we reap the reward of our present improvidence. It is merely a question of time, and time will solve the problem in a most unmistakable manner. What with our earth-butchery and prodigality, we are each year losing the intrinsic essence of our vitality. Our country has not yet grown feeble from this loss of its life-blood, but the hour is fixed when, if our present system continue, the last throb of the nation's heart will have ceased, and when America, Greece and Rome, will stand among the ruins of the past." Is it to-day, I would ask, quite certain that our country has not already grown feeble from this cause? When we reflect upon the notorious fact, that nowhere has this deterioration of the soil been so deep, so general, so exigent, as at the South, under the combined effect of an exhaustive culture, and the rude husbandry of slaves, incapable of developing more than a small portion of the native resources of the earth, and remember the aggressive spirit in which Southern statesmen pushed for the acquisition of new territory on our Southern border, and for domination in all the public domain, and the connection of this fatal policy with the present civil war, who shall say that an accursed thirst for land, more land and new land, stimulated by a wasteful, profligate agriculture, that robbed the soil of its wealth, and the man who tilled it of his wages, has not, in some degree, ministered to that madness of treason which seeks with all the arts and engines of destruction the ruin of the nation?

It needs not, however, the present calamity of civil war, or the deserts that mark the limits of ancient states, to make clear as light that a migratory, nomadic agriculture, that first plunders the earth and then abandons it, must at last enfeeble the national strength. It is all involved in the proposition which science has over and over again demonstrated, that every crop takes from the soil ingredients which are indispensable to vegetation, but of which no soil contains an inexhaustible supply.

As a necessary corollary to this proposition, science enjoins upon agriculture as the condition of a self-sustaining and lasting vitality the precept, that whatever is taken from the soil by the harvest must be restored to it again. The violation of this precept inflicts an injury upon the country, a wrong upon the race. It tends even to the extinction of the human species, or what is quite as bad, to thrust it backward towards barbarism. To destroy the productiveness of the soil, to squander the elements of that productiveness, is to destroy the hopes of civilized humanity upon earth. It robs posterity of its just birthright to a career of progress. By what right shall we, the creatures of a day, the transitory tenants of this fair and fertile earth, a little while intrusted to our keeping, despoil it of that without which human advancement, human existence, is impossible, and turn it over, sterile and impoverished, to the generation we summon into being, and charge as we are charged, with the great destiny of man? Is not this to tempt the creating Providence? Through the dark infinitude of countless ages while night brooded over chaos, to that dawn when light was kindled in the heavens, and the morning stars sang together, and through all the rounds of change that light has shown upon since light was, this fragment earth has been preparing for the habitation of the sons of men. By fire and furnace heats, and icy congelations, by the lava torrent, and the grinding glacier, by the earthquake and the volcano, the upheaval of mountains, the ocean's deluge and the river's flood, by tempest and whirlwind, by the powerful action of the sun through eons of alternating day and night and ever revolving seasons, by the kingdoms of vegetable and animal life whose multitudinous tribes ruled by rhizodont and mastodon are now extinct, the moist, absorbent, fluent, vibratory atmosphere is evolved and purified, the solid rock is made and crumbled, and its powdered grains sorted and washed and mingled in the loam and mould, the flow and distribution of the waters are fixed, and all things toned to the temperature that suits the home of man. Through all the cataclysms of the world, the minerals of the harvest have been borne as in the ark that bore the fate of man upon the waters of the flood, until at last they have been safely garnered up in the ripe and fruitful soil. To take from the earth this precious diamond dust and not restore it, to destroy the providential uses of these costly products of all time, and so imperil man and his dominion, is it not a sin against the creation, is it not a forbidden thing, as truly as though the injunction had been graven on the tables of stone, and thundered from Sinai with the commandment, "Thou shalt not steal?"

Let an advancing morality teach our duty to the soil. It is but lately that the dumb and helpless brute was protected from the cruelty of man by the penalties of the criminal code. Let the appeal of a starved and emaciated soil touch the instructed conscience of civilized humanity. But whether the duty be recognized or not, the infraction of the law will bring its direful penalty.

In the light of these considerations, it is not with unmixed satisfaction that we regard the progress of mechanical triumphs over the soil. We welcome, at a time when all the resources of the nation are needed, the accession of fifty million acres to the productive land of the country, that was made in the ten years of the last census; and we rejoice in an increase of agricultural product, greatly outrunning the increase of population, accomplished by means of improved agricultural implements and thousands of miles of additional railroad. But it is important, in connection with the consideration of the conditions of a permanently prosperous agriculture, to call attention to the fact that these tremendous mechanical agencies, whose aggregate effect is so astounding, are so many mechanical advantages in accelerating the process of exhaustion. Using these powerful appliances, you pump the waters from the well no longer by hand, but with a steam-engine. The greater the yearly crop gathered, the greater the drain upon the fertilizing elements of the soil, and the sooner their limit is reached; the more important, too, it becomes to find some counteractive tendency, which shall restore the equilibrium so injuriously disturbed by the deportations of the harvest.

Let the processes of nature, ordained by that wisdom that was at the foundation of the world, direct our inquiry. Throughout her infinite domain to the remotest star, not an atom of matter, not a throb of force, even to the faintest vibration that pulsates in a ray of light is ever lost. The thunder that shakes the firmament, the lightning that rends the rock, the tornado that prostrates the forest, the convulsion that rocks the earth and opens gaping seams which swallow up cities, are operations in which she but combines and recombines her everlasting elements. An unending circle of self-adjusting change preserves forever the balance of her stupendous harmonies. Nothing loses a function except to gain one ; nothing comes to an end which is not a beginning. Every stage is a stage of transition. All things flow with the tide of time, and the current is continually returning upon itself. The trees grow old and at last decay; their mould builds up the ascending columns of another wood. By the processes of growth, the dust of the earth is upraised in grains of wheat and corn. Wheat and corn, as food, are assimilated by the organisms of animal life. Upon man and bird and beast alike descends the inevitable decree, " Dust thou art, and unto dust thou shalt return ; " and so the cycle of transformation is renewed.

Where, then, among the forces of society, shall we seek the principle, whose operation shall harmonize with nature's grand economy, and be the basis of a system of agriculture that shall be perpetual and self-sustaining in the elements of a fertile soil ? The conscience of the individual is of too limited a scope to be trusted to decide upon grounds of permanent well-being, the issue in which present gain is met by a possible or prospective loss to unborn generations. This principle, if found, will be found most effectually established in the economy of the national industry, and so established that the present shall not be called to the difficult virtue of self-sacrifice, the resources of the future shall not be endangered, and the very working of the farm shall lay the foundation for still more abundant harvests. I find the hint of the principle sought in that rule of good farming which enjoins the consumption upon the farm of the products of the farm, and the selection for the market, not of the hay and turnips, but the mutton and the beef. This economy, carried out upon a national scale, would give us a distributed home consumption of agricultural products, at diffused and accessible centres of a diversified mechanical and manufacturing industry, and of the commerce which such industry creates. For at these centres the fertilizing constituents of the harvest accumulate. Rejected by the processes of consumption, still as suitable for the crop as when deposited by the last inundation, they become again available to all neighboring farms, to which they are as truly the raw material of an agricultural product, as iron, cotton and wool to the machine-shop and the mill. The spread of cities like Lawrence throughout the land, with different industries adapted to local capabilities, will give to the agriculture of the nation the conditions of a self-sustaining, perpetually compensated and lasting fertility. The agriculture of China, that antedates the buried epochs of the Egyptian kings, and to-day flourishes and feeds the swarming millions of that empire, is based upon the principle that seeks from the city restitution to the farm of what is taken from it by the harvest. Great as is the benefit which agriculture already derives from the neighborhood of centres of industry and commerce, it has hardly begun to use the resources which abound in such localities and should be made available. In a true economy, the city and the town should be regarded by the farmer as a part of his farm domain. They are so by the laws of nature. They should be so in the practice of husbandry and the regulations of their police.

The problem of utilitizing the sewage of cities, which is so earnestly discussed abroad, has vital relations to the progress of civilized states. Through the sewers of cities draining into rivers and the ocean, the highest properties of the soil are irrecoverably lost. The turbid currents of North River, the Thames and the Seine, are richer than Pactolus with its sands of gold. For that which is pollution to their waters is the touch of magic to the fields, and the power of food for successive generations of men. The value of this material as a fertilizer is obvious, but it has been comparatively estimated and put beyond controversy by the experiments of the Prussian government in reclaiming land with the sewage of Dresden and Berlin. Land, which without any applications yielded but three to one from the seed sown, and seven to one when treated with the ordinary resources of the farm, yielded fourteen to one when fertilized from the sewer. As a mere problem of pecuniary saving it is a momentous one. The fertilizing portions of the sewage of the city of New York are computed, on the lowest estimate, to be worth seven million dollars per annum. We have authority for saying that the wasted drainage of the city of Boston is capable of restoring annually to a high condition thirty thousand acres of sterile land. The yearly waste of fertilizing elements in Great

Britain and Ireland are carefully computed at one hundred and forty million dollars. There is no direction in which ingenuity has of late been oftener or more effectively exercised in the industrial arts, than in contriving modes by which the dross, the shavings, the chips, all the unassimilated residues that remain after the completion of the main product, are converted to some profitable use. But there is no problem to which the ingenious mind could turn itself with greater advantage, than that of utilizing sewage. The invention of a plan, by which the slime and sediment of cities may be transformed into corn and wheat for human sustenance and the vigor of the vegetating earth be perpetually renewed, gives scope for one of the most beneficent systems of economy ever devised. The revenues of a kingdom would be a cheap equivalent for such a plan; the statesman, seeking for his country unfailing sources of prosperity; the sanitary physician, striving to convert the fountains of disease and pestilence into fountains of life and strength; the farmer, anxious to invigorate his exhausted lands; the chemist, eager to give new proofs of the resources of his favorite science; the engineer, who would render a public service, can afford to give this subject his deepest thought and care.

The intimate connection that exists between the prosecution of the arts of mechanical and manufacturing industry and the progress of a nation, needs no illustration in this city, county or Commonwealth. The theme is a familiar one. The annual manufactures of Massachusetts, valued at two hundred and sixty-six million dollars, and structures like these we see around us here, distributed throughout her borders, are works that manifest her sturdy faith. This faith she has cherished along with her love of knowledge and of freedom; or rather these are the phases of her humane and earnest love of progress. In a diffused and diversified national industry, and an exchange of its products by an unfettered domestic commerce, she has ever striven to establish the firm safeguards of independence,—union and liberty. How wisely she strove, how unwisely her counsels were neglected, let the witness be the mad rebellion that now rages; which was nourished into being by the hope of aid from foreign states; which seeks to destroy the Union, and to found an empire based on slavery; and which began in the confident belief of its leaders that one single crop raised on Southern plantations, and not equal in value to the loyal home-consumed hay crop of the North, would, nevertheless, in consequence of its abnormal relation to foreign manufactures and the exchanges of Northern commerce, bring the governments of the United States and Europe in submission to their feet. In this belief, when they raised the flag of treason they arrogantly proclaimed cotton to be king. To-day, Massachusetts with the bayonet debates on bloody fields the cause of independence, union and liberty. But it is the same cause which, on questions touching the national industry, she debated through the eloquence of a Webster and a Choate. And now, when the policy of national disorganization that has ruled and rioted in the land so many years has culminated in revolt, the first resource of the nation, with which it seeks to invigorate and combine its abused and dissipated strength, is the encouragement of the national industry. The prosecution of a gigantic war upon the principles of a sound financial policy calls for large annual revenues; such a course is necessary to maintain the national credit, and, in the case of an inconvertible currency, to prevent depreciation and the rise of prices. These needed revenues the government derives in largest measure from manufactures. The development of manufactures, such as can be made to take root by a temporary adjustment of tariff and excise, naturally becomes and has become a part even of the revenue policy of the nation. Accordingly, the country is sprouting with new growths of mechanical and manufacturing industry. Let them cover the land. Let villages and towns, the centres of these imperial and liberalizing arts, multiply and increase, to develop a progressive and prosperous agriculture, to deepen the foundations and quicken the life of society, to distribute the benefits of skilled labor reinforced by an iron-armed machinery, and increased in productiveness a hundred fold, to establish the union of the crop of the farm and the labor of the neighboring factory, foundry, or furnace in ultimate products, which shall become the staples of a pervading domestic commerce at the lowest cost of making exchanges; such a commerce as has been recognized since Adam Smith declared the principles of the wealth of nations as the most profitable to communities and states. So knit the fibres and harden the sinews of the national strength. Science has called attention to the general fact that the simple substances of which all material things are composed do not, except in combinations with each other, enter into or influence the organic growth of plants. So in the social economy, not the isolation of the farmer or the manufacturer, but the union of both gives the needful element of social organization.

Let England strain every nerve to gain and hold possession of the markets of mankind with her vast and world-embracing system of manufactures and commerce, and let her strive with equal effort to feed from her garden patch the millions whom she thus employs; and so doing, let her teach the docile nations to devote themselves exclusively to the culture of the earth, and persuade whom she may. We will observe her practice, and draw our precepts for ourselves; and hail

"The rise of empire and of ARTS."

THE INTERESTS OF AGRICULTURE.

From an Address before the Middlesex North Agricultural Society

BY JOHN A. GOODWIN.

We have higher motives than ever for striving to elevate our various callings, and to render our New England homes more prosperous and attractive. What can be done to advance the interests of *agriculture* in particular, that being the base of the industrial column—the *foundation* art, from whose wants and desires all other pursuits and professions spring?

In selecting a topic from so wide a field I can hardly hope to choose that which may seem to all the most desirable. For instance:—a friend I see here from Billerica, may think that I ought to hold him up to censure, and prove that he deserves no premiums from the Society's funds, because he tolerated so many scores of caterpillars' nests this year on his apple-trees and worthless wild cherry-trees along his wall, that his orchard looked as if a fire had passed over it, and vermin enough had been produced for the destruction of all the orchards in his neighborhood, next year. He is right—he, and all like him, ought to be cut off for a year from premiums and good-standing here, but I must leave him to the gnawings of the caterpillar of conscience.

Another friend, from Dracut, may think that I am about to argue against his right to even a gratuity on his fine articles exhibited, because he allows a plantation of thistles to fringe the highway all along his land, where I saw them scattering their seed for next year's crop, by the thousand over his farm, and by the *ten* thousand over the farms of his neighbors. Now this friend, too, is right in supposing that he and all who are guilty of the like offence *ought* to be held up, on occasions like this, as very bad examples, but I must dismiss them with the wish that they were compelled to sleep upon the thistles they raise, until by united effort the vile weeds were banished to their native Canada to comfort the long-eared gentry gone thither to escape the draft!

Neither will I talk about that man of Chelmsford—a disciple of Nimrod—who to save a few extra cherries, shot all the robins and woodpeckers about his premises, tearing the twigs off his trees with the shot more than two years' growth will repair, and breaking the law at the same time. In this case, the subsequent bugs and cut-worms convinced the offender of his ungrateful folly, and no gratuity that we can pay would induce him again to slay his feathered benefactors.

Perhaps the trustees of our society may expect a discourse upon their policy of offering premiums for blooded bulls, and also for those doubtful quadrupeds called native bulls, thus rewarding one man for introducing good blood among our stock, and rewarding another man for adulterating the same blood when it has been introduced! Although I think the society thus commits a greater bull than any in its pens, I will not stop to express an opinion.

No—caterpillar-raisers, thistle-distributors, bird-murderers, and blood-debasers—though right in thinking you *ought* to be talked about, I must pass you by. That thoughtfulness of your committee, of which I spoke, prevents, and it is this: when they extended their late but imperative invitation, they said that twenty minutes would be long enough to speak, and that I must not on any account take over half an hour! So having consumed a fair portion of my allowance in preliminaries—in skirmishing around the outposts—I will devote the remainder of it to the idea I have, that the great want of agriculture among us is, a large increase of farms and a much thicker farming population.

I know the idea is that our section of country is about *full*, and that young persons wishing a farm should go to the West. Yet of the 42,000,000 acres in New England only 19,000,000 are occupied, and only two-thirds of even this space is what is called improved—that is used for pasturage, tillage, and grass, or for building purposes. So, less than one-third of New England is *improved*, and not one-half is occupied for any purpose.

In our old farming county, where all the land is "occupied," there are 220,000 acres "improved" and 128,000 acres unimproved. Suppose one-half of this unimproved land to be unfit for anything but wood, we still have enough left to make 1,000 additional farms of 56 acres each.

A large part of this land embraces swamps and pond-holes, surrounded by light soils. The drainage of the former and the exchange of a part of their contents, with the arid uplands about them, would yield some of the best soils in the county. This subject is much talked about, I know, and not a little has been done, but the thing has hardly begun in earnest.

To see what other people do, take the case of Harlem Lake in Holland, which lake was thirty-three miles in circumference. Some sixteen years ago the government commenced pumping it out by steam-power. At the end of four years the work was done, and the State had gained 44,500 acres of rich land at a cost of $80.69 per acre. This tract is now divided into farms of 49½ acres each, and it is estimated in time to support 70,000 people, or twice the population of Lowell. Such an undertaking as this cannot be expected in our region, but the case is interesting as showing what is thought profitable by the sluggish, money-loving Dutchman. In our county, however, are many small waste tracts, amounting to thousands of acres, which would pay for under-draining, even at the cost per acre of pumping out Harlem Lake.

Then these swamps and low places are great reservoirs of manure. For 4,500 years the humus of the uplands has been finding its way to the lower levels, leaving the soil impoverished. It is the part of agriculture to restore the loss. Dr. Dana has demonstrated this in his profound and excellent work, the "Muck Manual," a popularized edition of which should be in the hands of every farmer and gardener, and should be distributed by our society in place of many of its smaller cash premiums and gratuities. He there shows us that a cord of peat, muck, or of pond mud, mixed with one-third of a bushel of salt and one-third of a cask of lime, make a compost as valuable as a cord of stable manure, and at one-third of the cost. He adds these words, which, coming from so high an authority, should be emblazoned on the walls of our hall:—"*Nature never* *bestowed upon man, soil of greater capability of being made lastingly fertile, than the sandy light soil of New England!*"

My friend, Dr. Loring, of Salem, who happily combines theoretical, practical, and *remunerative* farming, found himself, three years ago, short of manure. He accordingly got out one hundred and seventy cords of muck from a swamp, and mixing one hundred casks of lime, put it in little heaps to freeze through the winter. In the spring, after thorough mixing, it had become excellent manure, costing him when spread, not fifty cents a cord, besides the original getting out. With this dressing and some small additions, he raised seventy-five bushels of corn to the acre, and left his land in good heart for future operations. In Maine, many cultivators have adopted Dr. Dana's method of making manure, so that farms, where few animals are kept, continually increase in richness, at a small expense.

But this operation is only half the work needed here. For every cord brought from the low ground, one or *two* should be carried back, giving muck composts to the uplands and sandy composts to the lowlands. Thus, year by year, over even our most obscure hills and valleys, the area of cultivation may expand, Nature yielding more and more of her bounty to a constantly improving skill and an increasing population.

But we have another store of fertility neglected, that is immense. The 220,000 acres of improved land in Middlesex County are divided into 4,300 farms. Most of these are three-storied. The five inches nearest the surface form the first story; the five inches next below are the second; the five or ten inches next under that make the third. Now statistics show, and good farmers assure me that they are correct, that in this county, and in the whole State, the average depth of ploughing is only five inches. Thus, while we improve only two-thirds the *surface* of Old Middlesex, we improve only one-third the *depth*.

To make room for more farms, the easiest and best-paying way is to shorten the length and breadth of the present farm, and increase its thickness. Agriculture is an exception to the general rule, and thrives the more as you *run it into the ground!* Good farmers admit this doctrine so generally that it may seem a waste of time to dwell upon it. Here is the trouble—they admit the *doctrine* in full, but do not admit the *ploughshare* half-way.

Just twenty-four years ago, a Boston house imported from England the first subsoil plough ever in this country. Yankee skill soon changed the heavy, costly thing into a series of ploughs calculated for all work and for all teams, from one horse to four horses or oxen. These subsoil ploughs, following the common plough in the same furrow, go down into the third story of the farm, not turning up the subsoil but shaking and pulverizing it, so that all three stories of the farm are opened to the warmth of the sun, the softening of the rain, and the purification of the air, with the myriads of plant-roots following in their wake. Of course, if the subsoil is sand and gravel, or mostly rock, the work may be overdone, but in every other case the deeper the cultivation, *with manure in proportion*, the better the farming, and curiously enough, the freer the land from wet in moist seasons, and the freer it is from drought in dry ones.

Now, my hearers may say—"We knew all this before, better than you!" Exactly so! But if you *know* it, why don't you *do* it? Why are subsoil ploughs so nearly *unknown* in so many of the towns in our society's limits, and the soil tilled by merely scratching the surface—or by what may be called skim-milk farming? Why is no premium offered by our society for subsoil ploughing, or some recognition made at our exhibitions that it is even *desirable* to stir the soil beyond the regulation depth of the ploughing match? For many generations the air and sun have been trying to ameliorate the subsoils of North Middlesex, and the corn and grass-roots, more enterprising than their owners, have vainly sought to pierce its clays and hardpans in search of plant-food for their benefit and ours, but you would not aid them with the steel fingers that alone can do the work.

You will often see, both in city and country, a mansion of which the best part is made into a *parlor*, furnished more expensively than all the house beside, but kept continually shut with close blinds and curtains, and a strong smell of mildew pervading the dark and solemn silence. Let the clergyman make his brief summer call and one blind is for a few moments set ajar, while he rests himself in a luxurious but mouldy chair. At length comes Thanksgiving, and the parlor is fairly opened, the only day in the year, perhaps; and when the mould is rubbed off, the dampness dried out, and the moist chimney has done smoking and begins to draw, the room for that short day seems like a habitable and even cheerful place, but on the morrow relapses into grim solitude.

To think of such a room is melancholy. But how much more melancholy is it to think of the deserted second and third stories of the farm, just spoken of—the spacious and valuable, but never visited parlors of the soil. Into their moist darkness no parochial visit introduces a chance ray of sunshine, and no festival, even once a year, cheers the richly furnished recesses with warmth and life.

Now there are a few subsoil ploughs owned by members of this society, and there are some as good farmers present to-day as can well be found. When our friends, the clergy, rebuke the evil of staying away from church, they have to address themselves to the faithful few who have come to church, and to whom therefore the censure does not apply. So in decrying poor cultivation, I have to speak to *you*, who are mostly right already, and to whom my remarks may seem like a last year's almanac—old news and dry reading. Still, it does not seem to be generally realized that it is easier to raise sixty bushels of corn on one acre than on two, provided the land is worth planting at *all*, and what is true of this crop is true of others, corn being a convenient type. The last returns showed that the average yield of corn in Massachusetts was twenty-eight and a half bushels, and in Middlesex County twenty-nine. Good farmers say that twice as deep ploughing, with more manure and cultivation, would certainly double this. Thus, our farmers can get as large crops from half their land as from the whole, and save much in hoeing, carting, &c., and raise better hay crops afterwards.

If Dr. Loring, by freely using muck-compost, gets seventy-five bushels of corn to the acre; if James Day, of Haverhill, by ploughing a light sandy field deep into the subsoil and working three cords of manure into sixteen cords of compost, gets ninety bushels to the acre; if Jabez Fisher, in Worcester County, by ploughing twice, twelve inches deep, and using compost freely, gets ninety-two bushels; if J. E. Porter, of Hadley, by using muck-compost, gets eighty bushels, and B. P. Ware, of Marblehead, ninety bushels, and Dr. Hartwell, of Southbridge, eighty-six bushels, and Wm. E. Livingston, of this society, by subsoiling and composting, gets seventy-five bushels—who shall say that the average of twenty-nine bushels to the acre is not a *reproach* to the farming of Middlesex, and a discredit to her three agricultural societies? If our farmers would only cultivate as much as they can plough *well* and manure *well*, how much better, even if they left the rest waste, and *especially* if they would devote the remainder to sheep-raising, that profitable, improving, but wofully neglected branch of our county's agriculture.

I believe a cardinal truth to be as follows: He is the best cultivator who produces a given crop, from the smallest surface, with equal expense. If this be acted on, the natural result will be smaller farms, and many more of them.

In conclusion—to occupy the room which improved cultivation will produce, how is the rising generation to be induced to adhere to agriculture? It is a lamentable fact that a constantly decreasing proportion of the young folks seem satisfied with country life. There is a longing and pressure for employment in villages and cities. It has been estimated that of each one hundred young men who come into the city to go into trade, only three secure a competence, and only one dies rich. How shall the other ninety-seven be persuaded not to come to the city at all—not to peril independence and manliness, and too often health and virtue; not to become any man's servant, running at his call, living on his favor, and always fearful of losing that? What anxieties and midnight studies, what desperate endeavors, what unhappiness, and what longings for the quiet old country life, attend on city business, even in most cases where success is the final result! How shall the ninety-seven be saved this, and be led to remain in that life where prosperity is so nearly certain, and where reasonable skill and energy is so sure of a due reward?

Rural life must be made as attractive as possible. The churches and schools, the lectures and libraries, neighborhood gatherings and village fairs, sleigh-rides, singing schools, and the old-fashioned huskings, paring bees, quiltings and merry-makings, all have their places; no one of them is beneath parental interest. It is a bad time when fathers and mothers forget they once were young.

Let the young people feel that they lose no substantial privileges by living in the country—that their schools are as good, their opportunity to get acquainted with the world about them as good, and their general prospects at least as good as though they lived anywhere else.

I know that it isn't necessary nowadays to urge people much to be easy with their children. The chief trouble many of the latter have is to govern their parents, who try to be submissive, but, occasionally forgetting, compel the young folks to enforce discipline. But, in that period to which every man is fond of alluding as an era of perfection—to wit: "When I was a boy"—it wasn't so. When I lived on a New Hampshire farm, the Fourth of July was hardly known, and the work on many homesteads often went on the whole of Fast Day, and till dinner-time on Thanksgiving. The only full holiday boys generally had, was glorious, never-to-be-forgotten muster-day. Is it strange they were anxious to leave the farm, and go where play days came oftener and recreations were more abundant?

Though faring much better than above described, I know *I* felt so one cloudy day, when, seeing the village boys on their way to the river, I leaned for a moment on my axe, remarking in a suggestive manner—"They say fish bite to-day," and received the comforting answer—"Stick to the wood-pile, and they won't bite *you!*"

While country youth are allowed to live more easily, care should be taken that they enjoy constant intellectual improvement—that, with their privileges, they learn the philosophy as well as the practice of their art, and appreciate its independence and dignity, becoming more and more interested in it as they approach the mile-stone of one-and-twenty.

Thus, with the subduing of our waste lands and the subdivision of our farms brought about by higher cultivation, there will be no lack of young enterprise to fill the new fields created—no trouble in persuading a fair share of the boys and girls to join hands and hearts in that noble calling which the Almighty taught to Adam, and in the pursuit of which he has, in every age, enabled Adam's successors to achieve no small share of prosperity and usefulness.

Then, as in Old Middlesex, in all New England and our whole *re-united* country, the rural homes increase from year to year, shall the graves of the fathers still be guarded, and the virtues of the fathers be cherished; while, with prosperity, intelligence and happiness throughout our borders, each generation, to the end of time, shall exhibit to the world the spectacle of a Christian republic, upheld by an undivided people and an unconquerable race!

THE SOIL OF NEW ENGLAND.

From an Essay before the Worcester North Agricultural Society.

BY GEORGE F. WORKS.

"The Earth is not yet finished."—T. S. King.

The soil of New England is thin, but underlying our fields and farms, we have others which we never saw. The rootlets of our cultivated plants wait patiently and silently, for the riches so long shut away from them to be unlocked; for the salts, the phosphates, the sulphates, and silicates to be disintegrated by the action of the weather. They are waiting for the deep plough to expose them to the decomposing influence of heat, frost, air and rain-water. The plough, for centuries has been coming nearer and nearer; increasing the size of bulb, root and tuber; giving more range and food to the roots, which forming little voltaic batteries, do their share toward preparing their own food; admitting air to the soil, aiding thus in the decomposition of humus. First came the anchor-shaped hook of wood, which we see on Roman coins, and which Cincinnatus was using when called off to defend Rome against the Gauls.

But the progress was slow; and two thousand years after, the plough which Israel Putnam left in the furrow, when called off to defend Boston, bore too great a resemblance to it. It is true that the decaying vegetation of cycles of years, has spread the Western fields with humus apparently inexhaustible, but who would seek there what he might find in his own vineyard by digging. It would be a concession to ignorance and indolence; and in future years, that which seems inexhaustible wealth of soil, will be exhausted by the spendthrift style of agriculture followed there. Already have the worn-out fields of Virginia come begging to New England for agriculturists to restore their their fruitfulness; agriculturists, with the science and industry which a hard, rocky soil engenders; with industry, produced by surmounting difficulties; science, called in to supply natural deficiencies.

Not those who have the most means have accomplished the greatest ends. The prisoner, who, with a knife and bit of boxwood, made a perfect watch, accomplished more than he might under less painful difficulties. Not that country with the finest agricultural advantages, has produced the best farmers. The South Sea Islander has but to stretch forth his hand, and the overladen bough satisfies his wants. If the soil and climate do all, men do nothing, like spoiled children of fortune.* Those stones, useless as they seem to be, have called forth much mechanical skill. The lever and fulcrum are thrown aside, and powerful engines lift ponderous boulders from their bed of centuries, upon which the plough-points have been blunted so long.

In pulverizing the soil, in exposing its particles to the action of the elements, the agriculturist becomes a chemist. Whether he knows it or not, he is a chemist, with the fields for his crucible, the sun and winds for a furnace and blow-pipe. He mixes the soil with ingredients in such proportions as the plants he cultivates requires, trusting to the weather to form the proper disintegrations and combinations. He feeds his plants as he feeds his animals. A pigeon, fed on food in which there is no phosphate of lime, dies; its bones become too frail. The stalks of grain, grown on land where silicate of potash is wanting, break down under the weight of their own ears. Oats grown on sand treated with nitric acid, will not blossom; and an oak is dwarfed to the size of a fern by starvation.

The soil of New England is stony; but our ancestors reared whole families on the stoniest of it. The plough of the son glides smoothly through soil from which those double walls and huge moles of innumerable cobble-stones have been taken, at the expense of the strength of the ancestor. Should we and those who come after us, practice their patient industry, our soil might get rid of the reputation of being stony. It is rough; but the Swiss peasants build like eagles on the heights of the

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* Liebig speaks of a place in Europe where the inhabitants live on milk and sweet chestnuts; the ease in the production of which, is the cause of their *intellectual weakness.*

Alps, and bring up their children on giddy cliffs where none beside, but the chamois, climb; and in some places in Italy, the women carry up soil in baskets placed on their heads, to form terraces on the sides of the mountains. It embraces sandy plains; but the plains of Belgium were sandy, but by the application of agricultural science, this sand, once almost as unpromising as Cape Cod, now sustains a population sufficient in numbers to quash the theory of Malthus.

In draining a marsh, we add to the available surface of the world. The Duke of Devonshire, who drained the Bedford Level, and the Emperor of France, who* drained the marshes of Salone, were public benefactors. Much of the soil of New England is undrained, cold, unproductive, wet, insoluble. But these marshes are magazines of humus; rich mines which the rivulets have carried there from the decaying leaves of centuries of vegetation, rich as the most fertile soil of the West, but now the abode of reptiles, bearing nothing but coarse grass, and none of the constituents of the blood, to produce which, Liebig says, is the true object of agriculture; nothing to support animal life; nothing of the iron, phosphorus and gluten of the human frame-work; nothing to support the brain which moves the world. It is in this, that "Man may be called to be a co-worker with the Infinite Mind;" a promoter of the great plan, which was commenced when God separated the waters from the land. The noble consciousness of this power over the soil, which is little short of that of creation; the feeling that one has made land do its share toward the support of civilization, renders the making of soil thus easily, infinitely better than the seeking it ready made.

The soil of New England is hilly and stony, thin and sandy; but it has done its fair share toward the agricultural reputation of the nation. There are better farmers in New England to-day, than in more favored portions of the country. They are not generally men of one idea. The various kinds of crops their farms produce, drive them out of that, and they generally know more or less of the theory of rotation of crops, deep and

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*While in exile, the Emperor was asked why he paid so much attention to the study of books on *draining*. "I am fitting myself to become Emperor of France," said he, "and one of my first acts shall be to drain the marshes of Salone," and so it was.

shallow ploughing, application of fertilizers, underdraining, &c. These things are of very little interest to the farmers of the West, who cultivate their specialities, and whose soil *will* produce a crop, provided the seed is sown.

The hills of Worcester County produce better butter and cheese than the hills of Ayr. The soil of Cambridge better pears than France the home of pears. Hovey's Seedling, the result of careful horticultural science, originated there to be known beyond the Atlantic; and the Hubbardston Nonesuch, Roxbury Russet, and Rhode Island Greening are household words. There is no better latitude than that from Boston through to the lakes, for the growth of apples. Exporters say that apples produced there are less liable to decay.

Very much farther north, the seasons are too short, and much farther south, they are too long. The trees grow to wood, form too few fruit spurs, and store too little starch, gum, and sugar, for the support of blossoms the ensuing year. Thoreau says in the "Atlantic Monthly": "The trees of New England embrace all the most valuable kinds on the continent. I never have a botanical specimen sent to me, but I am sure to find something like it in my rambles; and I even expect to find the Victoria regia, on Concord River."

But what must be done to arrest the decay which in many places is going on; which, while the land around our cities is becoming a garden, is blighting some country neighborhoods. What must be done to keep the sons of New England on their native soil; who now yield to the allurements of the fertile West; pour into cities, or adopt any other pursuit rather than cultivate their native fields?

In farming there has been too great a strain upon the muscles, and too little upon the brain; too much physical, and too little intellectual labor. The muscles have become stiffened, while the brain has suffered by inactivity. Says Channing: "Manual labor is a great good, but in so saying I must be understood to speak of labor in its just proportions. In excess it does great harm. It is not as good when made the sole work of life. It must be joined to high means of improvement, or it degrades instead of exalting.

"Man has a various nature which requires a variety of occupations and discipline for its growth. Study, meditation, society, relaxation, should be mixed up with his physical toils. He has intellect, heart, imagination, taste, as well as bones and muscles, and he is grievously wronged when compelled to exclusive drudgery for bodily subsistence." We have had too much art and too little science. Farming has been too empirical. We have been guided by a sort of independent empiricism, rather than by enlightened science. Not that a well instituted experiment for deciding any particular point should be disparaged, but life should not be *all* experiment. Too many of our farmers toward the close of life, look back upon their earlier efforts as having been guided by a policy essentially bad. "Time and capital," says Liebig, "are wasted in experiments." A few successful results, cannot establish a reliable rule. We have decried the long experience of scientific men, called it "book knowledge," "impractical," forgetting that these very theories are the result of practice, and that our own practice has a theory to it.

The mechanic, receiving the data and formulæ of forces and agencies as true, works straight forward to a result, the truth of which he does not doubt. The farmer, though the laws governing the growth of a blade of corn, more impenetrable perhaps, but not more unreal, are as old as the world, is slower to receive them—the laws of motion are no more certain and fixed than those of chemical affinities; the binomial theorem no more a fixed fact, than that gypsum (sulphate of lime) when sown upon land, will react upon the ammonia in the air. Therefore, agriculture, which supports all, has been slow to take its stand among the sciences.

Boys, deeming agriculture the lowest of arts, the meanest of vocations, have sought the professions; the ministry, but have been forced to turn to the woods and fields for their noblest, sublimest lessons; the study of medicine, but in their study of chemistry, have come to find themselves better farmers than ever, and discover that a better remedy than any in the whole *pharmacopœia*, is the healthful exercise which out-door labor gives.

It is a pity that the beauties of farming should be better seen from other stand-points, than the one the farmer himself occupies; that they who are shut up inside four walls of city brick, should know more of chemistry, botany, mineralogy, entomology, than those whose daily occupation brings them so much in contact with these sciences; that through their distant and casual glimpses, they should know more of the book of nature, than those before whom its pages lie constantly open.

The agricultural college will do something toward remedying this. It will be a guiding light, a starting point, a repository where all that is known of tillage shall be embalmed; which shall elevate the mind to its proper sphere in farming; which shall be a place where men may make sure use of the experience of the past, as stepping-stones toward something higher. It is not our purpose to enter into any argument for agricultural colleges, but it seems that New England, with her mixed crops, her soil so undeveloped and so capable of development, will absorb them into her educational system with alacrity. They may educate men away from the plough, but they *need* not do so.

If a boy is to become a merchant, he prepares himself not only practically, by an education gained in the counting-room, but also in the broad principles of the law, and political economy. The lawyer must become versed in jurisprudence, ere he dares trust himself at the bar. The physician must get deep into pharmaceutics and pathology; and one by one almost all civilians have been dropped, during this war, from the roll of high military officers. To-day, what men seemed to doubt at first, is plain, that men who have studied the theory of war deeply, are best military leaders. But the agriculturist has generally been forced to pick up his knowledge as best he could, at the plough, in the newspapers, and by dear experience.

Scientific farming has been brought into great disrepute by its votaries, or those who pretend to be such. Some of these might be called amateurs, anything but scientific farmers. Many of these try to till the soil on the strength of theory alone, and fail. The large expenses incurred, and the small results obtained by these, have caused men to shun anything which savored of science. Many of these having large fortunes, have tilled the soil for show, pleasure, and experiment, rather than profit. There are others who have farmed for a livelihood, but ignorant either of the theory or practice of farming, have seized upon a hobby, and in following it, have set at naught the rules of economy and judgment. These hobbies have led them to cultivate crops unsuitable to their localities.

Grass is the principal crop in New England; the cattle, beef, and grain we raise, are accessaries; and any departure from a policy favoring the production of grass, except in localities warranting a change, is a loss. We sow our grain that the land may become regenerated for the ensuing crop of grass. We cannot compete with the West in raising corn. A pound of beef raised here costs more than a pound brought from there; and a horse raised in Massachusetts, costs twice what one costs raised in Vermont. Investing in fancy fertilizers, has almost ruined the fortunes and the farms of some. Our bogs lie much nearer than Peru, and by adding alkalies their humus becomes soluble.

It is a pity, besides being a proof of bad judgment, to let our resources run to waste. A farmer who lets his manure heaps dry up in air, the ammonia fly off to benefit another man's growing crops, while he incurs heavy expenses in buying fancy fertilizers, must make up his mind to poor success. Guano is the opium of tillage, producing illusive and dazzling results, but exhausting the productive capacity of the soil, by means of its alkalies. We have in mind a farmer, scientific, and yet economical and practical, who tills the soil scientifically and profitably; who culls from the jarring evidence of the experience of others, all that worth preserving; who makes the rules of nature his own, gathering up all, so that nothing is lost, and into whose business the capital of thought enters largely.

The agricultural college cannot, it is true, give men common sense where that is wanting; but it may help give an impulse, a zest to a pursuit, which has been so unattractive to so many; teach the farmer to appreciate the dignity of his position, as owner of his domain in fee simple; keep the sons of farmers upon their native fields, and tend to staunch this hermorrhage. But not to colleges alone must we look for a remedy. The majority of our farmers must serve out a long apprenticeship at the plough and the hoe. *Thought* must be called in to our aid. "Labor becomes a new thing when thought is thrown into it, when the mind keeps pace with the hands." We must learn the *why*, as well as the *how*. We are acquainted with the plough as an implement of art; it also has a scientific aspect.

The sons of farmers must be fascinated with beauties surrounding their toils, of which they never dreamed. The fields must be tilled intelligently, and not blindly. The more we know of how God works, the better will be our own success and delight. Let the farmer become a man of taste; let his house contain a library; let him become familiar with the microscope and the wonders it unfolds; let his grounds be tastefully laid out—taste, like civility, costs little. Even laying stone-wall might be pleasant, and we might forget our thin-worn fingers, when it will contribute toward adorning our homesteads. We know a tasteful farmer, who is laying a fine face-wall in front of his house. An awkwardly-shaped cavity in it remains unfilled, until a nicely-fitting stone is dug from his fields. He fulfills a double purpose; his wall becomes beautiful and his fields smooth.

We are influenced imperceptibly by our surroundings. The face of the country, whether hilly or flat, has a vast influence on the character of its inhabitants.* The manner in which our homes are adorned, has a great influence on their inmates. The child commences its education before it can talk; and unattractive surroundings bear a strong, early and constant influence, toward educating boys away from the plough. The farmer stamps his character upon his fields and home, in unmistakable hand-writing. By the arrangement of his hedges, orchards, shrubbery and shade trees, he makes landscape. He is a painter in living colors. He has a pleasant or an unpleasant home, almost as he pleases.

Taste is consistent generally, with good judgment; and the practice of it does not require wealth, or a high education. Smooth fields are more productive than rough ones, and a tastefully arranged farm will sell for much more than one upon which less taste has been shown. There has been very little expense incurred in making this difference; a little *thought* has been expended; a plan worked out, formed perhaps, while others were idle. We are idle for an hour; we might have planted a tree which would have made us happier for a lifetime. Not every tree is useless which does not bear tangible fruit. We admire the taste of our ancestors, who planted the elms before our doors. They have been bearing the fruit of joy and beauty a hundred years. The cherries and apples please our coarser tastes; these our more *refined* sensibilities.

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* A writer says that a flat country produces *flat heads*. Byron is said to have owed his poetical proclivities to a residence in youth among the Scottish Mountains.

The Washington Elm has borne fruit as well as the Stuyvesant Pear-tree.

Let the farm be a place to live upon, and not a machine to run for a limited period, out of which to wring a living. Let it be such a place, with such attractions, that its sons when called off to other pursuits, may look back upon the time spent in the old homestead as the happiest part of their lives; that the shipwrecked sailor may cling more hopefully to his plank, remembering it; that the merchant may keep a vision of it before his mind, unobscured by those of wealth and gain, and in the evening of his life may wander back to beautify with his fortune his early home.

THE EDUCATION OF THE OX.

From an Essay delivered before the Worcester North Agricultural Society.

BY A. B. DAVIS, OF SHIRLEY.

> "Their strength, or speed, or vigilance, were given
> In aid of our defects."—COWPER.

The employment of the term "Education," I am aware, implies knowledge and a certain capability of moral progression; but it might as well be at once understood that, while taking issue with this position, I recognize and accept the implication of truth, in the remark attributed to Sidney Smith, that "there is no other animal but man to whom mind appears to be given for any *other* purpose than the preservation of the body." Twenty years' experience with beasts of burden, has put me in possession of facts which prove them susceptible of education and moral improvement to a degree considerably outrunning the popular apprehension.

To elucidate these facts and call attention to a new source of good and pecuniary wealth to the agriculturist, is the object of this paper. Of course it is not practicable to give the full *modus operandi* of training upon the basis of the positions assumed, but I hope by originality of treatment to awaken interest in a science which must, I am persuaded, form no unimportant branch of the practically progressive farmer's education.

Much of the maltreatment to which domestic animals are subject, is owing to ignorance of the true conditions of successful management; but I propose to urge the discipline of animals solely on the score of *economy*, leaving out of view, for the present, the *moral* aspect of the case. *Pecuniary profit* we suppose to be the farmer's object in the breeding and rearing of animals. Let us see. A man breeds and rears a pair of steers for ordinary farm work. Other things being equal, a pair "trained up in the way they should go," would not attain greater *size* than if left in natural and lawless freedom; but symmetrical development and ease of management being *desiderata* with New England teamsters, early and judicious training becomes a pecuniary consideration.

The *sine qui non* of successful ox-training involves the following conditions: 1st, likeness of temperament and disposition; and 2d, equality of size, strength, and age. These conditions are placed in the order of their importance. Many a poor beast is made to suffer a kind of martyrdom from being "unequally yoked" by his ignorant master. And, as a teamster of some experience, I feel warranted in affirming my belief that no small number of our class become martyrs to the ignorance above mentioned.

The hired teamster being required to perform a certain amount of work, he is not at liberty to correct any vices or defects in the team given him, but must worry through his time, often under the most trying circumstances. "It is hard learning old dogs new tricks," and none are more likely to appreciate the significance of this proverb than teamsters placed in situations where they have to deal with ill-bred, mis-matched, and vicious animals. Where the standard of "education" is unworthily low, people are wont to regard all reformatory efforts as Utopian, and not likely to promote their interests in any direction.

But what are the facts? Comparing trained with untrained cattle, the former will command, in the general market, from five to twenty-five dollars more per yoke than the latter. And in localities where beauty and facility of management go at their maximum price, the difference is greater. The common remark with intelligent buyers is—"Money is no object—we are willing to pay for cattle that are well matched, smart, and handy." But there are minor advantages growing out of judicious discipline which are not so readily apprehended, and which are not so easily made appreciable. I will notice a few of the most prominent. One fair resultant—and which will be readily granted—is the *facility of movement* acquired in the process of training.

One of the most common wheel conveyances in use upon the farm is the ox-cart; and it is no inconsiderable point of economy to be able to change cattle off and on to this vehicle easily and rapidly. In busy seasons, what is the advantage of smartness and dexterity in a hired man, if the farmer cannot make it available through his team, with which the man is so constantly required to operate? Among all the varied positions in which wagons and carts require to be placed, there often exists the necessity of "backing;" and none but the best trained cattle are able to execute this *manœuvre* with facility. Indeed, an acquaintance with working cattle extending over a period of twenty years, has failed to furnish a single instance of a pair perfect in this respect, who were not the subjects of constant and persistent training and use, *from calves upward to four years old.* Almost every farm barn thirty years ago was constructed so that "backing in" was often necessary, and yet few oxen of that day were capable of doing it.

In the majority of cases where such a *manœuvre* became necessary, the oxen were taken off the "spear" or tongue, and brought "right about face," to push or shove the load in. This is always a difficult operation, requiring considerable time, and one can readily perceive the economy of discipline, which enables the farmer to back any load his cattle are able to draw. But the advantages of discipline in draft are not less apparent, whether in cases where "a long pull, a strong pull, and a pull together" is requisite; or where an ox's entire strength is needed for a single spring or lift, (as in turning a large stone,) the superiority of the trained ox is so marked as to impress every impartial and unprejudiced witness. With such there is no "baulking," the common causes of it being removed.

Cattle, properly mated, will generally pull together, and generally *all they can*, if their driver so signifies; and though his judgment may be at fault, it is very seldom, indeed, that they would get abused, or be required to pull a third time. With mis-mated cattle, it often happens that one is spirited and ambitious, while the other is "slow-moulded," and easily discouraged in a bad place. Such a pair, in the hands of a hasty-tempered, injudicious man, soon becomes worthless for most kinds of labor.

The energetic, "high-strung" ox after a time gets discouraged from having to receive much of the whipping which his mate deserves, and much ill-treatment which neither of them deserves. But, perhaps, the most marked distinction between trained and untrained oxen is observable upon the *road.* Speed and endurance are qualities valued in cattle designed for hauling and "holding back" upon New England roads. All the varied minutiæ of superior training are requisite here, and some of them may be seen in the best light. But, perhaps, I have made the desirableness of thorough, judicious training sufficiently apparent without further illustration; and, grasping at the hope lodged in that "perhaps," I take courage to assert that a yoke of educated oxen, (other things being equal,) will perform one-third more work with one-fourth less "wear and tear," than a pair only trained up to the common standard. Besides this there is the physical and moral effect upon the driver, which is above pecuniary price.

Re-asserting what appears in the first part of my paper, viz.: that likeness of disposition and equality of size and strength are indispensable conditions, I proceed to some practical hints on the early training of animals adapted to farm labor. While urging the propriety of early matching and training, I feel bound to state what appears to be the only objection to such a course; viz.: the risk of a dissimilar development, either in point of size, strength, organization, or temper—in the process of growth. And as some security against such a risk, the employment of a sagacious, experienced person in the selection of calves, presents itself as a suggestion worthy of adoption.

The farmer must expect to give himself some trouble at the outset, and will often find it necessary to search among the herds of his acquaintances, at a considerable expense of time; and when successful must not grudge what may seem a sum out of proportion to what his experience may suggest as the maximum return. Having selected and brought his calves together, let them be kept so during the entire period of training. The manner of rearing calves I shall not discuss, not deeming it relevant to the subject of this essay; if, however, they be well kept, their size and strength at three months will admit of their being yoked and exercised in some of the more simple movements—such as turning *each way;* starting and halting at command; backing, and "holding up;" "standing out" and "standing up," separately, &c., &c. In all these primary exercises, the experienced teamster sees the chief advantages of early training. At this stage animals are supple and docile, and the *whip* almost finds its "occupation gone,"—at least there is no need of severity. One of the most difficult branches of the science may then be taught with assurance of complete success. The art of backing, properly, is seldom taught, and more seldom acquired. Regarding this subject of "backing," I beg leave to submit a few illustrations.

An ill-founded notion seems to have possessed the minds of not a few farmers and teamsters, touching the *ability* of the ox to force a load back by the horns. To this prejudice I attribute the general failure of working cattle in this particular. It is, however, an easily demonstrated fact that Nature has lodged more strength in the *neck* and head of the ox, than in his breast and shoulders. This is patent to the most casual observation of bulls and oxen when *fighting*. The size and strength of the *horns* of the ox also favor this view. In some parts of Europe this principle seems to be better understood: hence we find the ox and the cow appropriately harnessed for draft by the horns, and executing their tasks with apparent ease.

Having exercised sufficiently without draft, let the calves then be hitched to a miniature cart or wagon and be instructed in all the manœuvres required of oxen. At first the load should be light, and when backing, care should be taken not to injure the embryo horns. At this point, too, let the "sidewise movement" receive some attention. As this movement is not generally understood, I will describe it as well as I may, verbally. Every teamster who understands his business knows that one of the best tests of superior training is to be found in the manner in which a pair of cattle approach and place themselves astride a cart-spear or tongue. None save those most thoroughly drilled can do it handsomely.

When approaching the cart the "nigh" ox should be made to gradually place himself parallel to the spear, (the "off" one following suit,) and when sufficiently near, should step *sidewise*, (his fore and hind legs simultaneously,) *over the spear*. This is rather difficult of execution, and should be taught *prior* to any requirement of use. In other words, let cattle be taught to move "sideways" squarely, *to* and *from* the driver, as if on parade. This movement once taught, is of incalculable value in all multiform exercises of ox-labor. The same rule reversed will apply when approaching the spear from the *left* hand.

Perhaps in this place I should indicate my preference among the *whips* known to teamsters. In some parts of Worcester County drivers use a whip made of common shoemaker's thread, by means of a very simple machine, which any farmer's boy can construct. This cord, which is very hard and stiff, and of uniform size, is looped on to the stock, and "let out" as it wears up. For cheapness, durability, and efficiency, I know of no whip to compare with it, and yet I hesitate to recommend its general use, for the reason that it can be made *too harmful.* It is an error to suppose that an ox-whip should be either large or long: the *stock* may be a few inches over three feet—the *lash* about *six inches shorter.* Such a whip can be easily flourished, and will inflict greater punishment when required, than one much larger. In the manner of castigation as a means of breaking and governing refractory animals, it is not easy to draw the line between "a necessary act," which Cowper says "incurs no blame," and severity which would be obnoxious to the charge of cruelty. As I cannot dwell at length upon this most vital question, I must content myself with stating, and briefly illustrating, the great governing principle, which is—recognition of the intelligence, apprehensiveness, docility, and *dignity* of the animal. Farmers! let never a wanton or wicked blow be struck, nor a harsh, unmeaning sound be made; let nothing be done at the instance of mere caprice, or passion; cause all persons in any way employed with your teams to recognize and regard this principle.

If, after sufficient trial, an animal proves incorrigible, by every principle of morality, by every consideration of wisdom and *economy*, release him from the yoke forever. It often happens that a man possesses an odd steer which he thinks too handsome to kill, and so sets himself to find a "mate." If such a steer at the age of three years old proves, on trial, turbulent and ugly-natured, it will be nearly an impossibility to break him into sobriety and usefulness. There is so much wildness, will, and muscle about steers that have run till three years old, that the task of breaking them is a formidable one, and not generally advisable.

After cattle have been taught to "lay up" close to the spear when backing, they should constantly be required to place themselves right, before attempting the exercise, and should be looked after while performing. In this place, I would caution drivers against a common error—the practice of *going before* cattle to back them. Oxen thus treated never perform the operation handsomely.

While backing, the driver should keep a little *back* rather than forward of the ox's middle, as there is a tendency to "wing out" when handling a heavy load. When using a cart or wagon upon the farm, and especially around barns, or in the door yards, the teamster should never *ride*, or allow any one else thus employed to do so. This common practice is fatal to the discipline of trained cattle. The driver should walk steadily by their side, not often using the whip, nor speaking in any but a firm, distinct manner, and *manifesting chiefly by motion*, his will. In the matter of ox-yokes my experience has not failed to impress me with the need of a revolution—most of those in common use being too *heavy*, "bungling," and every way inconvenient. These remarks specially apply to those made by Nourse, Mason & Co. Indeed, I have met with but very few of unexceptionable pattern, and those were manufactured in a part of Worcester County where ox-training is carried to a point much nearer perfection than in any other locality of which I have knowledge.

FARMS.

ESSEX.

From the Report of the Committee.

We have had but one entry for the premium this year—that of S. A. Merrill, the occupant of the Derby Farm, in South Salem. We think this is the first time, in the history of this society, that a person who has leased a farm has offered it for a premium.

The committee visited the farm on the 11th day of July, at which time the grass was cut and most of it in the barn. We noticed the fields were very smoothly mown, and raked clean, and the hay appeared to be of good quality. The general appearance of the crops indicated that they were well planted and cultivated thoroughly. The fences and buildings were in about as good condition as we expect to find on a farm that has been let for many years. Some of the committee think the society ought not to give a premium to any farm having such poor fences and buildings; others think the tenant could not be expected to expend much in repairing and keeping in order the fences, and if his management in other respects was judicious, he ought not to be deprived of the premium on account of neglecting that which belonged to the owners to do.

The farm was visited by part of the committee on the 19th of September. At that time it looked as well as we expected to find it. Although we have seen some farms where the weeds were kept down better, yet we have seen many more that were not kept so clean. Mr. Merrill has given his attention mostly to raising vegetables for the market, and he has been very successful in this. This he thinks more profitable than making milk. Our impression is, that if his cows had received more of his attention they would have done better, though we think that milk can be produced cheaper farther from the city, where land is not so valuable. The yield of milk appears small to us, compared with the other products of the farm. According to his statement his cows did not average four quarts per day each for the seven best months of the year for making milk.

The committee, when they visited the farm, were satisfied that a very large amount of produce was raised for the amount of labor expended; and when we notice the price at which the early vegetables were sold, we saw more distinctly than we ever realized before, the advantages which the market gardener derives from his hot-beds.

We regret that Mr. Merrill, in giving his statement of the farm, has followed so far the example of those, who, for the past few years, have made statements of their farming in our transactions. Where the hay and roots are consumed on the farm, in making up the account, these should not be reckoned. What we wish to know is the income.

In the society's offer for premium on farms they say—"For the best conducted and most improved Farm, taking into view the entire management and cultivation, including lands, buildings, fences, orchards, crops, stock and all other appendages, with statements in detail relating thereto."

We think Mr. Merrill has improved the farm much, and for this improvement and his skill and success in raising vegetables for the market, we award to him the first premium of thirty dollars. WM. R. PUTNAM, *for the Committee.*

Estimate of receipts and expenditure on the farm, made up by the committee from Mr. Merrill's statement:—

The rent of the farm annually, ...	$1,000 00
Part taxes, ...	30 00
Wages of 7 men at $20.00 per month, for 7 months,	980 00
Board of 7 men at $4.00 per week, . . .	840 00
Wages and board of two boys for 7 months, .	306 00
Paid boys for weeding onions, ...	54 00
Wages and board of three men in winter, . .	564 00
Wages and board of milkman for one year, .	448 00
Paid for fish-guano for manure, . . .	140 00
Paid for grain, ...	600 00
Blacksmith's bill, ...	600 00
The interest on cost, and depreciation of hot-beds,	60 00
Interest on value of carriages and farm implements, ...	180 00

Wear of same, ...	$100 00
Interest on value of 32 cows, at $40.00 each, .	76 00
Interest on value of 5 horses, at $150.00 each, .	45 00
Interest on value of one pair of oxen, . .	12 00
Total, ...	$5,510 00

We think we can form a better estimate of the real income of the farm if we suppose it continued through the year as a milk farm. In that case we deduct the hay and roots from the income, and add the sale of the milk at the rate of the other seven months. Taking these figures as our data, we find the

sales of farm to be	$11,649 49
And the expenses to be, ...	5,510 00
	$6,139 49

Leaving six thousand dollars for the services and support of Mr. Merrill and his family.

Statement of Samuel A. Merrill.

I offer for premium the farm known as the Derby Farm, in Salem, carried on by me during the past eleven years.

This farm is situated in that part of the city known as South Salem, and consists of one hundred and seventy-five acres, of which ninety acres are in pasture, twenty acres in salt marsh, forty-five acres in English grass, and twenty acres in tillage. The English grass land has been laid down from one to ten years. The pasture has been in its present condition during the whole time I have occupied.

When I commenced on the farm, there were about ten acres in tillage. No part of it, however, had been used in the cultivation of onions, and was not put to this use to any considerable extent until I had been on the farm several years. The present year I have cultivated the tillage land about as follows:

Onions, ...	6	acres.
Potatoes, ...	5	"
Cabbages, ...	4	"
Tomatoes, ...	1	acre.
Sweet Corn, ...	½	"
Beets, ...	½	"

Marrow and Hubbard squashes, . .	1½ acres.
Miscellaneous vegetables, . . .	1½ "

Most of my turnips have been raised as a second crop.

Included under the enumeration of English grass land is one acre laid down this year with wheat, and one acre with barley.

The live stock consists of five horses, thirty-two cows, one bull, one yoke of oxen, and from six to ten swine. With milch cows I have not been particular in regard to purity of blood, but have endeavored to obtain and keep the best grade and native stock.

Have generally found it most expedient to keep good, fair-sized horses, weighing from eleven to twelve hundred. The amount of manure used annually upon the farm has ordinarily been about one hundred and fifty cords. This has included that made by the live stock and considerable night manure hauled from the city, all composted with meadow-mud from the salt marsh.

It may not be improper to mention, that my experience in the matter of top-dressing, has led me to use, contrary to the general practice, green cow-manure for this purpose.

To obviate the objection that such manure is apt to be so coarse as to be in the way of the scythe and rake, I have found it well to spread it in the month of March, and then, after the frost is fairly out of the ground, run over it with a brush harrow, which reduces it into such small particles as to render it in no way troublesome afterwards. I have generally drawn from the city thirty or forty cords of night-manure. This I have mixed with the meadow mud and barnyard manure, all in one mass, in about equal portions of each, and forked it over twice at least, and in some years three times.

As to rotation of crops, I would say that I have found it inexpedient to attempt to raise either cabbages, beets, or turnips, successive years upon the same piece of land. But as to most other farm products, I have never been convinced that there was any necessity for alternating the crops—as, for instance, onions and carrots do not only as well, but much better when continued successively on the same land. Potatoes do well for four or five years, and, for aught I know, for a much longer time. The same can be said of corn and tomatoes. Squashes, however, ought not to be planted successively on the same land.

I have made it a point to get my seed into the ground at the earliest possible time in the spring, as my nearness to a good city market renders it expedient to give special attention to the raising of early vegetables. In order to avail myself of the advantages of the earliest spring market, I found it profitable to start my plants, such as lettuce, early cabbages, tomatoes, etc., in hot beds. For this purpose I constructed, a few years ago, three ranges of beds, each two hundred and twenty-five feet long, situated on a southerly slope, and facing the south. They are made about a foot high, and have a sash covering, and above this a trellis covering, stuffed with salt hay or straw. These hot-beds are managed as follows:—In the fall I fill them with litter, house the sashes, and lay down the trellis cover. This prevents the earth from freezing inside of the beds. About the first of March I take out the litter and put in about six inches of horse manure, and cover the manure with about four inches of soil, sow the seed, and close the bed nights with both coverings. After the seed comes up, I water the plants every other day, and keep the covers open in the day time to let in air, except when the weather is too cold for the plants. Transplant into the fields about the fifteenth of April. By this means I can get cabbages into the market by the twentieth of June, and some exceptional years I have got them into Boston market as early as the ninth of June. The lettuce generally heads in the bed, ready for market, by the fifteenth of April. Tomatoes are generally ripe and ready for market from the middle of July to the first of August.

I have never tried the experiment of making butter, but have taken it for granted that it was more profitable to sell the milk, especially in view of the fact that there was a good milk route connected with the farm when I commenced occupying. This route I have supplied ever since. During the summer the cows get their whole living in the pasture—no extra feed. In the autumn they have had the range of the mowing fields. In the winter, they have generally had ten bushels of beets, with what English hay, black grass and rowen they would eat. The roots were fed out to them once a day only—mornings.

As to the farm buildings I am not aware that there is anything peculiar about them worthy of notice, except that the cow stanchions are in a long, low-roofed L, running out from the barn. This I regard as a very good feature, as the hay, which is wholly kept in the main body of the barn, is by this means preserved from the deterioration, which the steam and heat of the cows cause.

The products of the farm for the past season, from April 1 to Nov. 1, 1864, are as follow:

Milk, 25,714 quarts, sold in the city at an average of 7 cents per quart, ...	$1,799 98
Cabbages and cabbage plants, sold as per sales-book,	1,500 00
Onions, 2,500 bushels, at $1.75 per bushel, . .	4,375 00
Carrots, 20 tons, at $15 per ton, ...	300 00
Mangel wurzel, 10 tons, ...	150 00
Flat turnips, 500 bushels, at 25 cents per bushel, .	125 00
Ruta-bagas, 200 bushels, at 60 " " " .	120 00
Early potatoes, tomatoes, and other garden sauce, .	2,202 51
Squashes, ...	50 00
English hay, 80 tons, at $30 per ton, . . .	2,400 00
Salt hay, 20 tons, at $17 per ton, ...	340 00
Barley, 30 bushels, ...	45 00
Wheat, 25 bushels, ...	56 25
Rye, 20 bushels, ...	40 00
Wheat straw, 2 tons, ...	30 00
Barley straw, 2 tons, ...	30 00
Apples, 15 barrels, ...	45 00

Sales of pork per year have been from seven to eight hundred pounds.

For seven months of the year I keep seven men and two boys; for the rest of the year, three men; and during the season for weeding onions, three extra boys. Besides this, one man is constantly employed on the milk route.

The land is exceedingly well adapted to the raising of hay and vegetables. The soil is somewhat varied in different localities,—in some places a dark loam upon a clayey bottom; in others, a light, warm, friable soil. It is also very well situated as to the influences of the sun and moisture, needing no draining, and still capable of resisting droughts.

Most of my marketing is in Boston, though the early vegetables are generally sold in Salem.

In giving this brief statement, I have endeavored to confine myself to a plain and simple report of the character and capabilities of the Derby Farm; and if I have ventured upon giving any inferences, they are only such as are founded upon my own personal experience, and, therefore, have with me the force of actual facts.

PLYMOUTH.

Statement of A. G. Pratt, of Middleborough.

In anticipation of the almost fabulous prices realized this year for all kinds of farm produce, I have endeavored, with the *least* expense, to secure the *greatest* possible yield, from every portion of my farm; but I would not be understood that I *approve*, or *recommend*, the "skinning process," as practised by some farmers, which every one must see would shortly be ruinous to any farm.

ACCOUNT OF CROPS AND EXPENSES ON FARM OF A. G. PRATT, FOR 1864.

[Lot No. 1—Orchard—2 acres, 17 rods.]

Expenses.		*Income.*	
½ acre of rye,	$3 00	5 bushels rye at $2,	$10 00
Picking apples,	5 00	50 bushels apples at 50c.,	25 00
Total,	$8 00	Total,	$35 00

[Lot No. 2—Barn Lot—2 acres, 13 rods.]

Expenses.		*Income.*	
Securing 3 tons hay,	$15 00	3 tons hay at $25,	$75 00
Cultivating cabbages,	2 00	Cabbages sold on lot,	20 00
Manure for same,	2 50	Apples sold on tree,	10 00
Total,	$19 50	Total,	$105 00

[Lot No. 3—Neck Lot—17 acres.]

Expenses.		*Income.*	
Spreading manure half day,	$00 75	9 tons hay at $25,	$225 00
Securing 12 tons hay,	60 00	3 tons hay at $15,	45 00
Total,	$60 75	Total,	$270 00

[Lot No. 4—Meadow—6 acres, 4 rods.]

Expenses.		*Income.*	
Securing 4 tons hay,	$12 00	4 tons fresh hay at $12.50,	$50 00
Total,	$12 00	Total,	$50 00

[Lot No. 5—Rye and Oat Field—7 acres, 3 rods.]

Expenses.		*Income.*	
Ploughing 3½ acres for oats,	$7 00	71 bushels oats at $1.10,	$78 10
Harrowing and sowing,	5 00	2 tons oat straw at $10,	20 00
10 bushels seed oats, $10, (grass seed, $5,)	15 00	37½ bushels rye at $2,	75 00
Securing oats, $6, threshing, $7,	13 00	Rye straw sold for	22 00
Ploughing 2¼ acres for rye,	4 50	80 bushels potatoes at 75c.,	60 00
Harrowing and rolling,	3 00	½ acre rented,	3 00
2 bushels seed rye,	2 00		
Securing rye,	5 00		
Threshing and storing,	10 00		
Ploughing for potatoes,	2 00		
Furrowing, $1, planting, $2,	3 00		
6 bush. seed potatoes, at 80c.,	4 80		
10 loads manure for potatoes,	5 00		
Cultivating, $2, hoeing, $3,	5 00		
Digging and storing,	4 00		
Total,	$88 30	Total,	$258 10

[Lot No. 6—Corn Field—19 acres, 26 rods.]

Expenses.		*Income.*	
Ploughing the lot,	$15 00	170 bushels shelled corn at $2.05,	$348 50
50 loads manure for corn,	25 00	Corn fodder at $9 per acre,	50 62
Drawing manure,	6 00	9 bushels potatoes at 75c.,	6 75
Harrowing and furrowing,	6 00	Early round turnips,	44 00
Seed corn, $1.50, potatoes, 50c.,	2 00	Pasturing sheep,	12 00
Planting 5 acres 100 rods to corn,	10 00		
Cultivating both ways, (twice per row,)	6 00		
Hoeing corn twice,	25 00		
Cutting stalks,	10 00		
Cutting and drawing corn,	10 00		
Husking and storing,	15 00		
Manure for 60 rods turnips,	3 00		
Harrowing and sowing with machine,	75		
Hoeing turnips, $3, harvesting, $8,	11 00		
Total,	$144 75	Total,	$461 87

[Lot No. 7—Wood Lot—12 acres.]

Expenses.		*Income.*	
		15 cords wood at $3, (standing,)	$45 00
		Total,	$45 00

[Lot No. 8—Pasture—9 acres, 103 rods.]

Expenses.		*Income.*	
Repairing fence,	$2 00	Pasturing 3 cows,	$21 00
Total,	$2 00	Total,	$21 00

[Lot No. 9—Pasture—6 acres, 97 rods.]

Expenses.		*Income.*	
		Pasturing 1 cow,	$7 00
		Total,	$7 00

[Lot No. 10—Orchard—2 acres, 36 rods.]

Expenses.		*Income.*	
Gathering apples,	$5 00	10 barrels picked apples,	$32 00
Securing 1 ton hay,	5 00	40 bush. cider apples at 16⅔c.,	6 67
		1 ton hay,	25 00
Total,	$10 00	Total,	$63 67

[Lot No. 11—Wheat Field—7 acres, 101 rods.]

Expenses.		*Income.*	
Ploughing 3 acres for wheat,	$6 00	36 bushels wheat at $2.25,	$81 00
Harrowing and rolling,	3 00	2 tons wheat straw,	20 00
6 bushel seed wheat, $12, grass seed, $3,	15 00	60 bushels corn at $2.05,	123 00
Securing wheat, $7, threshing, $8,	15 00	Corn fodder,	13 50
Ploughing 1½ acres for corn,	3 00	2 tons hay,	50 00
50 loads manure, half spread, half in hill,	25 00		
Carting same, $5, harrowing, $1.50,	6 50		
Planting,	4 00		
Cultivating and hoeing, (3 times,)	15 00		
Cutting and drawing stalks and corn,	4 00		
Husking and storing,	00		
Securing hay,	10 00		
Total,	$112 50	Total,	$287 50

[Lot No. 12—Mowing Lot—4 acres, 22 rods.]

Expenses.		*Income.*	
Securing hay,	$15 00	4 tons fresh hay at $12.50,	$50 00
		1 ton bank hay,	18 00
Total,	$15 00	Total,	$68 00

[Lot No. 13—Mowing and Pasture—15 acres, 30 rods.]

Expenses.		*Income.*	
Securing hay,	$4 00	1 ton fresh hay,	$12 50
		Pasturing sheep,	12 00
Total,	$4 00		$24 50

[Lot No. 14—Orchard—2 acres, 10 rods.]

Expenses.		*Income.*	
On trees,	$2 00	By apples,	$3 00
Total,	$2 00	Total,	$3 00

[Lot No. 15—Mowing—109 rods.]

Expenses.		*Income.*	
Securing hay,	$5 00	1 ton hay,	$25 00
Total,	$5 00	Total,	$25 00

[Lot No. 16—Mowing—1 acre, 16½ rods.]

Expenses.		*Income.*	
Securing hay,	$5 00	1 ton hay,	$25 00
Total,	$5 00	Total,	$25 00

[Lot No. 17—Potato Field—6 acres, 107 rods.]

Expenses.		*Income.*	
Ploughing 2 acres for potatoes,	$4 00	280 bushels potatoes at 60c.,	$168 00
Manure for same,	9 00	5½ bushels beans at $3,	16 50
10 bushels seed potatoes at 80c.,	8 00	4 tons hay at $25,	100 00
Harrowing, $1, planting, $4,	5 00		
Hoeing, $8, digging, $10,	18 00		
Planting ¼ acre beans,	1 00		
Cultivating, $2, hoeing, $2,	4 00		
Harvesting, $1, threshing, $1,	2 00		
Securing 4 tons hay,	20 00		
Total,	$71 00	Total,	$284 50

[Lot No. 18—Orchard—145 rods.]

Expenses.		*Income.*	
Repairing fence, . .	$2 00	1 ton hay, ...	$25 00
Securing hay, . . .	5 00	26 bushels apples, . .	10 00
Gathering apples, . .	2 00		
Total, . . .	$9 00	Total, . . .	$35 00

[Farm Stock.]

Expenses.		*Income.*	
2 cows, at $40, . . .	$80 00	150 lbs. butter, $75, milk, $10, ...	$85 00
2 hogs, ...	75 00	600 lbs. pork, $100, beef, $20, ...	120 00
40 sheep, ...	80 00	22 lambs, $110, wool, $101,	211 00
Fowls, ...	25 00	Fowls, $85, eggs, $32, .	117 00
Total, . . .	$260 00	Total, . . .	$533 00

[Sundries.]

Expenses.		*Income.*	
Taxes, ...	$50 00	150 lbs. dried apples, .	$18 00
		Garden vegetables, . .	25 00
		139 loads manure, . .	139 00
Total, . . .	$50 00	Total, . . .	$182 00
Total, . .	$878 80	Total, . . .	$2,783 64
			$878 80
		Net income, . .	$1,904 84

Middleborough, Nov. 30, 1864.

Statement of Austin J. Roberts.

On account of the difficulty of procuring laborers, not so large an extent of land has been planted this year as usual. My attention has been turned to the cultivation of some of the more profitable crops, and to the greater concentration of labor.

The high price of help, and the increasing rate of taxation, will ultimately compel the farmer to make the most of his land, and farm well, or not farm at all; and the result will be that he will reduce the amount of ground in cultivation until the labor expended shall perform everything in the best manner.

I have cultivated this season five-eighths of an acre of tobacco, (the Connecticut Seed-Leaf.) The crop has been excellent, and probably will be remunerative. As it is not yet ready to strip, the amount of yield can only be approximated.

About the first of January, the tobacco will be stripped, sorted, formed into "hands," and put into bulk, to undergo the sweating process, and in the course of a week after, will be ready for the market.

The amount of labor necessary to the cultivation of an acre of tobacco is very great, but the profits also are large. The amount of expense attending this crop, including everything, has been ninety-six dollars, or one hundred and fifty-three dollars and sixty cents per acre. I have roughly called the product one thousand pounds, and the average price of the first and second quality leaf at twenty-five cents. Both estimates are probably below the true figures, which will be corrected in the next annual report.

It is an erroneous idea that tobacco is highly exhausting to a soil which is well cared for. No plant can impoverish land annually renewed by rich fertilizers, united with a judicious rotation of crops.

The tobacco fields of Virginia have grown poor, while those of Connecticut and Western Massachusetts produce far more grain and grass than they formerly did, arising from the thorough tillage of the latter, necessary to good tobacco crops, and the application of the best manure, with the concentration of labor upon a small compass; in other words, making a farmer farm well, or not farm at all.

Since my last statement one acre of swamp-meadow has been made into a cultivated cranberry-field. An adjoining bog having been successfully experimented upon by spreading small quantities of beach sand upon it in the winter, which made it very productive, I determined to reclaim effectually the adjacent piece. Instead of paring, which would have rendered the bog too low, I had the sods inverted. Six hundred loads of sand were carted on, in the winter, on the ice, and levelled to about five inches deep. In June and July twenty-five thousand bunches of vines were set out, averaging eighteen inches apart.

The amount of labor expended, exclusive of turning over the surface and bunching the vines, which was done by the job, was one hundred and thirty days; forty of which were expended in the care of the vines during the summer.

Few, if any, of the vines died, and they appear now to have become well rooted. The whole expense—the sanding done at extremely low rates—has been one hundred and eighty-five dollars.

Cranberries succeed on the shores of our ponds, particularly on the south-western side, without artificial flowage. The only cranberries raised in the town this season, on account of the untimely June frost, were produced on this and the adjoining farm.

In order to derive a greater profit from my pear-trees, and at the same time to have less care in marketing the many kinds in cultivation, I have grafted three-fourths of my trees to the Bartlett.

Large and small trees were cut completely down, and as many scions as necessary put in, thus forming the whole top at once.

The grafts have grown finely, many of them five or six feet; hardly one failed to take.

The apple crop has been small, it not being the bearing year with my orchards. Forty young trees—the Romanite apple—have been set out.

My large peach-trees were heavily laden with fruit, though but very few trees are as yet large enough to bear. Some of the three-year old trees produced a dozen or so. From the rapid growth of the trees, induced by cultivation, hardly much fruit can be expected for two or three years. Seventy-eight head-trees were added to the peach-orchards in the spring.

In speaking of the crops raised I would state, that every item of expense is to be found under the different heads of the appended schedule, with the value of the product raised. A debtor and credit account is necessary against each field, (the farm is divided into twenty lots,) and at the end of the term the whole amount will be shown.

Corn.—One field was planted, an improved Western variety, an account of which will be found in "statement" on premium corn; the other two lots were of the common Whitman corn; one manured with a compost of manure and peat, the other with hen-manure and ashes.

The amount of labor expended on the whole has amounted to seventy-nine dollars.

Potatoes.—This crop has been raised among apple-trees, and felt the drought rather more on this account. For the extent of land cultivated, the crop has been fair. The kinds planted were the Dykerman, Garnet Chili, New York Peach Bloom, and New York White Peach Bloom. The Dykerman were early, and some sold at one dollar and seventy-five cents per bushel.

Turnips.—This crop has been good; the yield two hundred bushels; the cost of crop is about eleven and a quarter cents per bushel.

Hay has come in about the same as last year. The fresh hay was taken on shares. On account of so much land being devoted to young orchards, and consequently kept in cultivation or ploughed once or twice in the season, the hay crop is smaller than it otherwise would have been.

Rye has yielded fifty bushels of grain, and three tons of straw. This crop has cost sixty cents per bushel, the straw being bonus.

HAY HALL, LAKEVILLE, Dec. 1, 1864.

MANURES.

MASSACHUSETTS.

Report of the Committee.

To the Trustees of the Massachusetts Society for the Promotion of Agriculture:

The reports of the competitors for the premiums offered for the tilling and manuring land for the three years of 1862,–'3, and '4, have been examined and reduced to tabular statements, which form part of our report. The directions for the cultivation of the lands appear to have been substantially followed.

Mr. Weld reports his estimate of the product per acre of each of his lots for the three years.

Mr. Perkins reports on a sixth lot dressed by drilling in twenty-four and a half pounds of Coe's super-phosphate of lime.

Mr. Ware gives his estimate of the amount of shelled corn and corn-stover per acre from each lot, and states that one hundred pounds of corn in ears gave seventy-six and a half pounds shelled. He has followed the directions for the experiments for the three series of three years each, and we take the liberty to quote his remarks,—that the said experiments have been of great value to him, and trusts that they will be useful to farmers.

Mr. Leonard gives a valuation of the product of each lot for the three years, as follows—

From lots 1, (corn, valued at $1.00,)	$7 44
2, (rye, " " 1.60,)	8 55
3, (hay, " " 1.00,)	8 16
4, (straw and stover, .30,)	7 00
5,	3 02

And estimates the rye crops on the manured land to average twenty-two bushels per acre.

The figures in the tables will enable any person to make a similar calculation, and the result in money value.

Mr. Curtis planted corn in 1862, again in 1863, and sowed barley in 1864.

Mr. Farmer divided his land of one hundred and fifty rods into three parts of fifty rods each, and made his experiments on each of them, apparently for the purpose of testing the relative value of the manures used.

The manure used on the lots in range No. 1, so called, was a compost, of three parts of cattle manure and one part of meadow mud, seventy-five and five-twelfths cubic feet to each lot, except lot No. 5. On range 2, seventy-two and five-twelfths feet of compost, one-third meadow mud, and two-thirds horse manure, two shotes having wintered on it. On range No. 3, compost of clear meadow mud, with eighty-three pounds of Coe's super-phosphate of lime to each cord of mud and same number of cubic feet. He reports no wheat, but wheat-straw, and he gives his estimate of the product per acre of each of his fifteen lots in straw, and the first and second crops of hay.

The crop of Mr. Hull appears to be small, but he states that he selected his poorest acre, hoping thereby to see the best result of the manure used according to the directions for the cultivation of the land.

An imperfect report was received from the Essex County farm.

It may be noticed that the lands selected for experiments vary in size from thirty rods to one acre. This explains the differences in the number of pounds of crop reported in the tables. The amounts of crop may have also depended on the fertility of the soil, in the strength of manure used, and the varieties of temperature and moisture.

The lots two and three, where the manure was ploughed in four inches or harrowed in, produced the largest number of pounds of crops, and it appears to be the general opinion that manures should be lightly covered by shallow ploughing or by good harrowing, or, in other words, that it should be well mixed with the soil when spread on the surface of land before planting.

This report concludes the three series of experiments for premiums offered by the society, and we think that the farmers, few in number, who cultivated lands in compliance with the request of the State Board of Agriculture, and for the chance of gaining the premiums offered, are well entitled to receive the thanks of the farming interest of the State for the care, attention, labor and expense which the experiments may have required of them, and also to receive the premiums to be awarded.

Respectfully submitted,
GEO. W. LYMAN, *for the Committee.*

BOSTON, February 10, 1864.

NOTE.—The premiums of $100 each were awarded to Mr. Ware, to Mr. Farmer, and to Mr. Weld. Gratuities of $50 each were awarded to Mr. Perkins, Mr. Curtis, Mr. Hull, and Mr. Leonard.

TABLE NO. 1,

Showing the pounds of crop on each of the five lots for the three years.

NAMES.	Lots 1.	Lots 2.	Lots 3.	Lots 4.	Lots 5.	Totals.
A. D. Weld, (100 rods,) .	578	759	621	598	368	
	920	1,058	782	920	322	
	75	117	97	78	43	
	270	393	333	232	257	
	405	510	430	420	330	
	2,248	2,837	2,263	2,248	1,320	10,916
C. O. Perkins, (30 rods,) his No. 6 lot omitted, . .	876	891	1,100	838	808	
	26¾	27¼	30½	28½	31	
	74½	74	82¼	46¾	71½	
	159	154¼	161	150	84	
	1,136¼	1,146½	1,373¾	1,063¼	994½	5,714¼
B. P. Ware, (1 acre,) . .	1,501	1,637	1,506	1,316	942	
	2,134	2,078	1,774	1,664	1,178	
	74	77	79	69	55	
	266	228	221	201	115	
	435	435	455	475	290	
	4,410	4,455	4,035	3,725	2,580	19,205
L. W. Curtis, (1 acre,). .	403	424	456	407	267	
	264	283	308	264	191	
	230	236	326	256	168	
	205	220	232	215	140	
	294	308	336	252	154	
	104	110	120	90	61	
	1,500	1,581	1,778	1,484	981	7,324
S. Leonard, Jr., (50 rods,) .	257	286	677	242	165	
	177	202	194	169	105	
	79	86	86	61	8	
	128	140	134	100	15	
	121	172	151	164	55	
	762	886	1,242	736	348	3,974
J. B. Hull, (1 acre,) . .	185	168	242	379	86	
	164	188	228	310	146	
	131	135	150	149	72	
	163	180	196	229	106	
	282	227	200	266	108	
	925	898	1,016	1,333	518	4,690
J. B. Farmer, First Range, (50 rods,)	19.14	16.80	18.15	14.19	11.71	
	328.	359.	373.	339.	210.	
	144.	158.	151.	113.	90.	
	491.14	533.80	542.15	466.19	311.71	2,344.99
J. B. Farmer, Second Range, (50 rods,)	16.99	19.30	20.13	14.52	15.68	
	117.	148.	283.	333.	198.	
	36.	81.	140.	128.	76.	
	169.99	248.30	443.13	475.52	289.68	1,626.62
J. B. Farmer, Third Range, (50 rods,)	7.92	8.91	8.25	8.74	8.16	
	49.	59.	56.	65.	–	
	17.	27.	27.	30.	37.	
	73.92	94.91	91.25	103.74	45.16	412.98
Total for three years of all the lots, ...						56,208.09

TABLE NO. 2.]

NAME AND RESIDENCE.	FIRST YEAR.			SECOND AND THIRD YEARS.			CROPS PER ACRE BY ESTIMATE.				
	Plots.	Shelled Corn.	Stover.	Clean Rye.	Straw.	Hay.	Shelled Corn.	Stover.	Rye.	Straw.	Hay.
		lbs.		lbs.	lbs.	lbs.	bush. lbs.	tons.	bush. lbs.	tons.	lbs.
A. D. Weld, West Roxbury, (100 square rods,) First year, Corn, Second year, Rye, Third year, Hay,	1	578	920	75	270	405	85–20	3.136	10–40	1.160	3,240
	2	759	1,058	117	393	510	108–20	4.460	16–40	1.1144	4,080
	3	621	782	97	333	430	88–40	3.256	13–48	1.660	3,440
	4	598	920	78	232	420	85–24	3.136	11–08	1.218	3,760
	5	368	322	43	257	330	52–33	1.576	6–08	1.56	2,640
C. O. Perkins, Becket, (36 rods in six plots,) First year, Corn, Second year, Oats, Third year, Hay, 24½ pounds Coe's super-phosphate drilled in to No. 6,	1	876	Whole crop of corn and stover wei'd green.	26¾	74½	159	–	–	–	–	–
	2	891		27¼	74	154¼	–	–	–	–	–
	3	1,100		30½	82¼	161	–	–	–	–	–
	4	838		28½	46¾	150	–	–	–	–	–
	5	808		31	71½	184	–	–	–	–	–
	6	720		31½	62¾	142	–	–	–	–	–
B. P. Ware, Marblehead, (1 acre,) First year, Corn, Second year, Clean Wheat, seed 2½ bushels, Third year, Hay, Corn weighed in ears,	1	1,501	2,134	74	266	435	97	5.33	–	–	–
	2	1,637	2,078	77	228	435	106½	5.16	–	–	–
	3	1,506	1,774	79	221	455	97	4.43	–	–	–
	4	1,316	1,664	69	201	475	85½	4.32	–	–	–
	5	942	1,178	55	115	290	60	2.94	–	–	–
L. W. Curtis, Globe Village, (1 acre,) First year, Corn, Second year, Corn, Third year, Barley,	1	403	husks. 264	230	205	5¼	straw. 104	–	–	–	–
	2	424	283	236	220	5½	110	–	–	–	–
	3	456	308	326	232	6	120	–	–	–	–
	4	407	264	256	215	4½	90	–	–	–	–
	5	267	191	168	140	2¾	61	–	–	–	–

J. B. Hull, Stockbridge, (1 acre,) First year, Corn, Second year, Oats, Third year, Hay,	1	185	164	131	163	282	–	–	–	–	–
	2	168	188	135	180	227	–	–	–	–	–
	3	242	228	150	196	200	–	–	–	–	–
	4	379	310	149	229	266	–	–	–	–	–
	5	86	146	72	106	108	–	–	–	–	–
S. Leonard, Bridgewater, (50 rods,) First year, Corn, Second year, Rye, Third year, Hay,	1	257	177	79	128	121	$7 44	–	–	–	–
	2	286	202	86	140	172	8 55	–	–	–	–
	3	277	194	86	134	151	8 16	–	–	–	–
	4	242	169	61	100	164	7 00	–	–	–	–
† Winter killed.	5	165	105	8†	15†	55	3 02	–	–	–	–
			1st crop.	2d crop.	straw.	1st crop.	2d crop.				
J. B. Farmer, Concord, (150 rods, divided in three ranges of 50 rods each,) First Range, First year, Wheat Straw, Second year, Hay, Third year, Hay,	1	19.14	328	144	3,062	7,552	2,024	–	–	–	–
	2	16.83	359	158	2,692	8,272	2,039	–	–	–	–
	3	18.15	373	151	2,904	8,384	2,336	–	–	–	–
	4	14.19	339	113	2,270	7,232	2,088	–	–	–	–
	5	11.71	210	90	1,874	4,800	1,424	–	–	–	–
Second Range, First year, Wheat Straw, Second year, Hay, Third year, Hay,	1	16.99	117	36	2,719	2,448	896	–	–	–	–
	2	19.30	148	81	3,088	3,664	1,184	–	–	–	–
	3	20.13	283	140	3,220	6,768	1,816	–	–	–	–
	4	14.52	333	128	2,323	7,376	2,592	–	–	–	–
	5	15.68	198	76	2,504	4,384	1,840	–	–	–	–
Third Range, First year, Wheat Straw, Second year, Hay, Third year, Hay,	1	7.92	49	17	1,267	1,056	600	–	–	–	–
	2	8.91	59	27	1,425	1,376	592	–	–	–	–
	3	8.25	56	27	1,320	1,328	608	–	–	–	–
	4	8.74	65	30	1,399	1,528	704	–	–	–	–
	5	8.16	taken off	37	1,306	taken off	624	–	–	–	–

TABLE NO. 3.

Quantities of Land.	NAMES.	Soil.	State in 1861.	Ploughing.	Aggregate Number of Pounds on the Lots.					Remarks.
					Lots 1.	Lots 2.	Lots 3.	Lots 4.	Lots 5.	
100 rods, .	A. D. Weld, . .	Black peat loam, .	Grass, ...	Substantially according to rules.	2,248	2,837	2,263	2,248	1,320	The state of weather is reported in each report as being dry, moist or wet, showing in this respect the usual variations in our climate, except those of 1864, which in some localities is reported to have been much drier than in others.
30 rods, .	C. O. Perkins, .	Yellow loam, .	Corn, ...		1,136¼	1,146½	1,373¾	1,063¼	994½	
1 acre, .	B. P. Ware, . .	Dark loam, . .	Cultivated, . .		4,410	4,455	4,035	3,725	2,580	
1 acre, .	L. W. Curtis, .	Loamy subsoil, .	Grass, ...		1,500	1,581	1,778	1,484	981	
50 rods, .	S. Leonard, Jr., .	Sandy loam, .	Grass, ...		762	886	1,242	736	348	
1 acre, .	J. B. Hull, . .	Wet, not heavy, .	Old sward, . .		925	898	1,016	1,333	518	
50 rods, .	J. B. Farmer, .	Light sandy loam,	Cultivated in corn in 1860 & 1861,		491.14	533.80	542.15	466.19	311.71	
50 rods, .					169.99	248.30	443.13	475.52	289.68	
50 rods, .					73.92	94.91	91.25	107.74	45.16	The temperature has never been reported in either of the series of experiments.
Totals, ...					11,716.30	12,680.53	12,784.28	11,638.70	7,388.05	
Aggregate pounds of crop, ...									56,208.86	

ESSEX.

Statement of B. P. Ware for 1862.

In competing for the premium offered by your society for the best experiments on the application of manure—offered this year, 1862—I selected an acre of land adjoining the lot upon which I commenced a similar experiment last year. The soil is a dark loam, nine inches deep, resting upon a gravelly subsoil—not leachy, but rather light—nearly level, with the exception of a gentle swell running across the lot. In April of 1861, four cords of compost manure were spread upon this land, and it was sown with oats. On the tenth of June, the oats having attained a large growth, they were turned under, and the land sown with carrots, but, owing to the dry, hot weather, the seed failed, and in July, I sowed flat turnips, which grew finely and yielded a large crop.

On the fourteenth of May last, I divided the lot into five equal parts, and manured four of them with compost manure at the rate of ten cords per acre, which manure was taken from a heap containing sixty-five cords, all forked over and worked together. I like to compost my manure all in one heap, (except some special manures,) as fermentation is more rapid, and I think there is less waste than in several smaller heaps.

Said compost heap was composed of meadow mud, sea manure and barn manure, the whole mass drenched with eighteen cords of night soil. The same quantity of manure was applied to each lot, and it was ploughed in eight inches in lot No. 1; four inches in lot No. 2; harrowed in in lot No. 3, and spread on the surface of lot No. 4 after planting; while none was applied to lot No. 5. The directions of the circular were followed to the letter.

May seventeenth, I planted nine rows of King Philip corn in each lot, three and a half feet apart, and hills in the rows the same distance—six kernels in a hill, and covered the seed one and a half inches deep. The corn was horse-hoed, or cultivated, three times during the season, and hand-hoed twice—not a weed was allowed to grow. October sixth, the corn was cut up close to the ground and stooked up. November third, being well dried and in good order, I had the whole weighed and stored in the barn, where it was husked within a week and carefully weighed.

Lot No. 1 produced 3,635 pounds of unhusked corn; 1,462 lbs. of sound ears; 39 lbs. of unsound ears; 2,134 lbs. stover.

Lot No. 2 produced 3,715 pounds of unhusked corn; 1,608 lbs. of sound ears; 29 lbs. of unsound ears; 2,078 lbs. stover.

Lot No. 3 produced 3,280 pounds of unhusked corn; 1,462 lbs. of sound ears; 44 lbs. of unsound ears; 1,774 lbs. stover.

Lot No. 4 produced 2,980 pounds of unhusked corn; 1,284 lbs. of sound ears; 32 lbs. of unsound ears; 1,664 lbs. stover.

Lot No. 5 produced 2,120 pounds of unhusked corn; 902 lbs. of sound ears; 40 lbs. of unsound ears; 1,178 lbs. stover.

One hundred pounds of ears yielded seventy-six and a half pounds of shelled corn. One bushel measure of shelled corn weighed fifty-seven and a half pounds.

From the above data it may be seen that the several lots produced, of the several kinds of products, at the rates per acre as given in the following table:

	Shelled corn.	Stover.	Unsound corn in ear.
Lot No. 1,	97 bushels;	10,670 pounds;	195 pounds.
" " 2,	106½ "	10,390 "	145 "
" " 3,	97 "	8,870 "	220 "
" " 4,	85½ "	8,320 "	160 "
" " 5,	60 "	5,890 "	200 "

SYNOPSIS OF THE WEATHER.

	First Third.	Second Third.	Last Third.
May, ...	dry.	dry.	dry.
June, ...	moist.	dry.	moist.
July, ...	moist.	moist.	moist.
August, ...	moist.	moist.	moist.
September, . . .	dry.	moist.	dry.

MARBLEHEAD, November 14, 1862.

Statement of B. P. Ware for 1863.

The acre of land upon which was commenced the experiment on the application of manure last year, I this year—May first—ploughed eight inches deep; then sowed upon the furrow two and a half bushels wheat, after soaking two hours in strong brine, and ploughed it in with Knox's gang plough, four inches deep; then sowed three pecks redtop and twelve quarts of herdsgrass seed, together with seven pounds of clover seed; then dragged it smooth.

The severe drought in June nearly ruined the crop, as the result will show. August fifteenth it was cradled and stooked up.

Lot No. 1 produced 74 lbs. of clean wheat, and 266 lbs. of straw. Total, 340 lbs.

Lot No. 2 produced 77 lbs. of clean wheat, and 228 lbs. of straw. Total, 305 lbs.

Lot No. 3 produced 79 lbs. of clean wheat, and 221 lbs. of straw. Total, 300 lbs.

Lot No. 4 produced 69 lbs. of clean wheat, and 201 lbs. of straw. Total, 270 lbs.

Lot No. 5 produced 55 lbs. of clean wheat, and 115 lbs. of straw. Total, 170 lbs.

SYNOPSIS OF THE WEATHER.

	First Third.	Second Third.	Last Third.
May, ...	wet.	moist.	dry.
June, ...	dry.	moist.	dry.
July, ...	dry.	wet.	wet.
August, ...	wet.	moist.	moist.
September, . . .	moist.	moist.	moist.

MARBLEHEAD, November 6, 1863.

Statement of B. P. Ware for 1864.

The result of the third year's crop grown upon the land to which your attention has been called for the two preceding years, is as follows:

The grass was cut June twenty-fifth, and each lot weighed June twenty-seventh, after being well cured.

Lot No. 1 produced	. . 435	pounds	of hay.
" " 2 "	. . 435	"	"
" " 3 "	. . 455	"	"
" " 4 "	. . 475	"	"
" " 5 "	. . 290	"	"

The extreme drought of June caused the crop to be very small, although I suppose the relative product of the several lots was not materially changed thereby.

This closes the third experiment of three years each that I have made upon the application of manure with regard to ascertaining to what depth manure shall be covered to produce the most profitable results. I have endeavored to be exact in all of the experiments, and have been a close observer of the results; and from them I am satisfied, that with the various crops, and taking one year with another, that to cover manure about four inches deep will yield better results than any other depth, and better cover it less than more. I feel that these experiments have been of great value to me, and trust that they may be promotive of the cause of agriculture.

SYNOPSIS OF THE WEATHER.

	First Third.	Second Third.	Last Third.
May,	moist.	moist.	moist.
June,	moist.	dry.	very dry.
July,	dry.	dry.	moist.
August,	moist.	moist.	moist.
September,	moist.	moist.	moist.

MARBLEHEAD, November 1, 1864.

PLYMOUTH.

From the Report of the Committee.

For the premiums offered by this society, under the direction of the State Board of Agriculture, for experiments in the application of manures, for a three years' rotation of crops, there have been four entries, one in 1860, two in 1861, and one in 1862. As these experiments are now completed, it may be well to inquire whether their results are sufficiently decisive to indicate a general and reliable rule for the application of manure.

The condition of these experiments, fixed by the State Board, required the division of the land into five equal plots, numbered 1, 2, 3, 4 and 5. "Divide the manure into four equal parts. Spread evenly one-fourth of the manure upon plot No. 1, and then plough the whole field of an equal depth. Apply another fourth to plot No. 2, and then cross-plough the whole to about half the depth of the first ploughing. Spread another fourth upon plot No. 3, and harrow or cultivate the whole field, after which sow or plant the whole, evenly, with any crop preferred. Finally, spread the remaining quarter part of the manure upon plot No. 4." No. 5 was to be cultivated without manure. As to the points at issue, No. 5 would seem to have been about as useless an appendage to the others as would be the fifth wheel to a coach. Fertilizers are as much a recognized necessity for our soils, under tillage, as is provender for our cattle. In experiments to determine the best method of feeding domestic animals, it would hardly be deemed necessary that one individual should be kept famishing. That our soils are rendered more productive by the application of manure, is beyond dispute. The cases in which they can be economically, or even safely cultivated without it, are exceedingly rare. The question is, Which of the four prescribed methods of applying manure will insure the greatest returns? The theoretical answer is, that method which will most thoroughly incorporate it with that portion of the soil usually penetrated by the roots of the plants to be cultivated.

This thorough incorporation cannot be effected by leaving the manure upon the surface, as in No. 4, nor, usually, by burying it beneath an eight-inch furrow, as in No. 1, or, by a single harrowing, as in No. 3. Although no one method of applying manure is precisely suited to all soils and all seasons, that of cross-ploughing in, as in No. 2, most nearly answers the conditions of thorough incorporation and reasonable protection from the waste consequent on free exposure to the sun and winds. In cross-ploughing land, the furrow, having no adhesiveness, is partly pushed aside, and but partly inverted, so that by a cross-furrow four inches deep, but a small portion of the manure can be buried to that depth; it will, especially, after a subsequent harrowing, be pretty evenly distributed through the soil, from the surface down to the depth of the cross-furrow. In most soils, suitable for tillage, the roots of cultivated plants are most numerous at some distance not greater than four or five inches below the surface, and wherever the roots are most numerous and most vigorous, manure will be kept sufficiently moist to insure its assimilation by the plant.

In an extremely wet season, manure from the surface may reach the roots of plants through the percolation of water; in an extremely dry one, the roots may reach the manure at the bottom of an eight-inch furrow. On very wet or dry soils, similar results may follow. But such seasons are the effect of meteorological accidents, which cannot be foreseen, and such soils are not those usually selected for cultivation.

It has been urged in favor of surface-manuring, that "Nature always manures upon the surface." Admitting this to be true, (which we do not,) the answer is, that art is superior to nature, or all civilization is folly. Nature deposits her seeds upon the surface, leaving time and chance to supply the needed covering. We deem it wiser, in planting, to furnish the covering at the outset, leaving nothing to time and chance, which can be made presently certain. The same wisdom should teach us to place our fertilizers in a position to be most easily accessible to the roots, which are the feeding mouths of plants. It is doubtless true that nothing is lost or annihilated; and manure, exposed upon the most sterile rock, would, through the operation of mechanical forces or chemical affinities, find its place and its use somewhere in the economy of nature. But we cannot afford fertilizers for a continent. Concentration, not diffusion, should be our motto in the use of manures. The burden of the song of all writers upon this subject has been, protection for manure, in the compost heap and in the yard; protection from the sun, from the wind, from the rains; and no good reason is apparent why this protection should not be continued in the field, where the facilities for such protection are greatest.

In each of the experiments under consideration, the succession of crops was nearly the same—corn, rye, oats, or barley, and grass. In two of them, plot No. 2, manure cross-ploughed in, gave the greatest value of products; in one, No. 1, manure ploughed in; and in one, No. 3, manure harrowed in. The smallest return, in each instance, was from No. 4, manure left upon the surface. As the manure upon these plots, numbered 4, was in each case ploughed in for the second crop, it is evident that its waste, by exposure during the first season, amounted to a considerable percentage of its original value. If anything has been rendered certain by these experiments, it is that the exposure of manure upon the surface of tilled land, is not good husbandry.

In Mr. Leonard's first experiment, commencing in 1860, the order of the plots, as to the value per acre of products, was as follows:

No. 2, manure cross-ploughed in, . .	$104 66
No. 1, manure ploughed in, . . .	98 13
No. 3, manure harrowed in, . . .	88 26
No. 4, manure left on the surface, . .	86 40

In Mr. Leonard's second experiment, commencing in 1861, the order and value per acre, were:

No. 1, manure ploughed in, . . .	$142 66
No. 2, manure cross-ploughed in, . .	135 86
No. 3, manure harrowed in, . . .	132 27
No. 4, manure left on the surface, . .	128 40

In Mr. Leonard's third experiment, commencing in 1862, the order and value were:

No. 2, manure cross-ploughed in, . .	$136 80
No. 3, manure harrowed in, . . .	130 56
No. 1, manure ploughed in, . . .	119 04
No. 4, manure on the surface, . . .	112 00

In Mr. Benson's experiment, commencing in 1861, the order and value were:

No. 3, manure harrowed in, . . .	$124 40
No. 2, manure cross-ploughed in, . .	123 85
No. 1, manure ploughed in, . . .	120 90
No. 4, manure on the surface, . . .	98 20

Perhaps no more satisfactory course can be pursued, with reference to results so various than that of reducing them to an average. This course is favored by the consideration that the weather, which, doubtless, had some influence on these results, can never be anticipated, except to the extent indicated by the mean of previous years.

The average value, per acre, of the first crop in rotation, corn, in the four experiments, was:

No. 2, manure cross-ploughed in, . .	$66 76
No. 1, manure ploughed in, . . .	66 27
No. 3, manure harrowed in, . . .	62 87
No. 4, manure on the surface, . . .	55 50

These figures indicate that, for corn alone, manure should be cross-ploughed, or ploughed in. The excess of products on land cross-ploughed over that ploughed only, is not, however, sufficient to warrant the increased expense.

The average, per acre, of the second crop, small grains, in all the experiments, was:

No. 2, manure cross-ploughed in, . .	$29 53
No. 1, manure ploughed in, . . .	29 51
No. 3, manure harrowed in, . . .	28 84
No. 4, manure on the surface, . . .	24 23

These results are, relatively, about the same as in the previous crop, and the same remarks are applicable, with the addition that, for a rotation of corn and small grains, the manure ploughed in for corn should be brought up by the plough, and mixed with the soil, before the second crop is sown.

The average, per acre, of the third crop, grass, in all the experiments, was:

No. 2, manure cross-ploughed in, . .	$29 00
No. 3, manure harrowed in, . . .	27 16
No. 4, manure on the surface, . . .	24 78
No. 1, manure ploughed in, . . .	24 40

We have here different results. No. 2 still has the lead; No. 3 and No. 4 have each advanced one step, while No. 1 has dropped to the foot of the list. The conclusion follows that for grass, after grain crops, (and the same is doubtless true for grass as the sole crop) manure should be kept near, but below the surface. It may appear, however, that, for reasons which will be suggested, No. 1 occupies too low a place in this comparison.

Averaging the value, per acre, of the four plots numbered 1, the four plots numbered 2, &c., for the whole course in rotation, we have the following:

No. 2, manure cross-ploughed in, . .	$125 29
No. 1, manure ploughed in, . . .	120 18
No. 3, manure harrowed in, . . .	118 87
No. 4, manure on the surface, . .	106 25

These results are in accordance with the theory that manure cross-ploughed in should give the greatest returns; the excess being $5.11 per acre over manure ploughed in, $6.42 over manure harrowed in, and $19.04 over manure left on the surface. This average excess of No. 2 is considerably diminished, as is also the relative standing of No. 1, by the somewhat peculiar results of Mr. Benson's experiment, the only one in which No. 3 gave an excess of products.

A few suggestions as to the details of this experiment may not be inappropriate, especially as the Massachusetts Society, by their award of premiums, have indorsed it as being "more thorough, exact, and reliable" than any other in this county, at least; a decision at variance with that of your board of trustees, who, on the recommendation of their supervisor, awarded to Mr. Benson the second premium only.

The land selected for this experiment was heavily manured the year before the experiment was commenced, the manure being cross-ploughed in without breaking the previously inverted sward. It, of course, remained near the surface till the first ploughing for the experiments, which, being about nine inches deep, placed this manure low down in the soil. No. 3, No. 4 and No. 2, measurably, were thus enriched below the surface by the manure first applied, and at or near the surface by that applied subsequently; while the surface of No. 1, during the first year, was not directly enriched by either application, both being deeply buried by the plough. No. 1 was thus evidently placed at a disadvantage, at the outset.

The cultivation was different in this experiment from that in any other, so far as appears from the statements of competitors. The manure applied to No. 1 was ploughed into a depth of about nine inches; yet it seems to have been reached by the roots of the first crop, corn, as No. 1 gave the greatest yield the first year. As the second ploughing was but six inches deep, the manure on No. 1 must have remained undisturbed, where the roots of the second crop could only reach it by penetrating some three inches of compact earth, or earth not in tilth; while, on each of the other plots, all the manure was contained in the six inches of earth kept mellow by the plough. This condition of things could but be unfavorable to the growth of the last two crops on No. 1; yet the crop of oats seems to have been diminished but slightly in consequence, being but twenty pounds per acre less than on No. 2, and twenty-five pounds less than on No. 3. Mr. Benson's statement that "No. 1 took the lead the first year in corn, but No. 3 got the lead the second year, and kept it," is calculated to convey an erroneous impression. The value of the products of No. 1 at the close of the first year, exceeded that of No. 3 by $3.95, and at the close of the second year by $3.40. The great falling off in the products of this plot was in the third, or grass crop, which gave $8.65 per acre less than No. 2, and $9.45 less than No. 3. A different result could hardly have been anticipated. Manure buried beneath nine inches of earth is not in a position to cause grass to set well or to grow vigorously. Had the manure on No. 1, and the earth in which it was imbedded, been mixed and mellowed by the plough the second year, its grass crop would undoubtedly have compared much more favorably with that of the other plots.

In this experiment we find a remarkable difference in productiveness between No. 3 and No. 4; No. 3, manure harrowed in, giving an excess of $26.20 per acre over No 4, manure left upon the surface. As in all other respects the cultivation was the same on both plots, this sum, $26.20, would seem to represent the value of the single harrowing. If such were the fact, we might reasonably expect an approximation to the same result in Mr. Leonard's second experiment, in progress during the same seasons, in very nearly the same locality, subject, of course, to the same climatic influences, on land much less retentive of moisture, and, consequently, less favorable to surface manuring. But in Mr. Leonard's experiment, the difference per acre, in favor of No. 3, as compared with No. 4, was but $3.87. In his first experiment, the difference was still less, being but $1.86. In view of the fact that Mr. Benson's experiment presents results so peculiar, and so different from those in other experiments, we may well be pardoned for expressing a doubt as to the entire accuracy of his figures, or, more reasonably, perhaps, of the correctness of his opinion as to the quality of the soil of the several plots.

On alluvial deposits, or on prairie lands, tracts may doubtless be selected, of equal productiveness throughout; but on our irregular drift, it is difficult, if not impossible, to find an acre so uniform in quality and texture that its products, if entered for premium, could be safely computed from the yield of its best or of its poorest rood.

Mr. Benson's plots were each thirty-two rods long and one wide, No. 3 being the central one. There is nothing in his statement of the mode of ploughing to indicate any undue advantage to this plot, by turning upon it soil or manure from the adjacent ones; but the whole field, as it now lies, forms a sort of watershed, being highest in the middle and lowest at the sides. If this is, to any extent, owing to its having been ploughed with back furrows in the centre, either during, or previous to the occupancy of the present proprietor, inequality of soil must be the inevitable result.

Accidental inequalities in soils arise from various causes, and their existence is sometimes unsuspected till the land is brought under tillage. The maintenance of a partition-fence during a series of years, in the days when sheep were found on every farm, seeking the sides of such fences for protection alike from heat and cold, has induced an improved condition of the soil in its immediate vicinity, apparent on cultivation long after all traces of its existence had disappeared. The peculiar productiveness of a particular strip of land, apparently similar to that adjoining, was observed by the writer, when it was first tilled under his notice, thirty years ago. Inquiries made at that time elicited the fact that, more than twenty years before, the ashes from a family leach tub were carelessly deposited thereon, not for purposes of fertilization, but as the most convenient method of getting rid of a worthless incumbrance. These particular causes of accidental inequalities in soils are not mentioned as probably operative in this case, but to show the difficulty of selecting an acre of land of equal quality throughout. That the excess of products on plot No. 3 over plot No. 4, in this experiment, was due to some inherent or accidental superiority of its soil, would seem as probable, to say the least, as that it was the effect of a single harrowing.

These suggestions are made, not because this experiment presents results at variance with a favorite theory, but because the award of so large a premium as one hundred dollars, by such a body of agriculturists as those constituting the Massachusetts Society of Agriculture, influenced though they doubtless were, to some extent, by its *quantity* as well as its quality, might be thought, by some farmers, to warrant the conclusion that harrowing in manure is the most judicious and profitable mode of applying it. Such a conclusion will be more satisfactory, if arrived at legitimately, through an examination of the facts, than if accepted upon trust.

As these experiments have been conducted at considerable expense to the society, considerable space is devoted to their consideration, in order that their results may be rendered easily accessible and practically useful to those for whose benefit they were projected.

ALDEN S. BRADFORD, *Supervisor.*

Statement of Spencer Leonard, Jr.

APPLICATION OF MANURES.—Mr. Leonard, in his statement, says: In compliance with the rules of the society, I will give you the result of the experiment in the application of manure, commencing in 1862, and closing in 1864.

The weather, while the crop was in the field this year, was nearly as follows:

	First 10 Days.	Second 10 Days.	Last 10 Days.
May, . .	wet,	moist,	moist.
June, . .	dry,	dry,	very dry.

The grass was a mixture of clover and bluegrass, and, on the plots manured was a fair crop. It was cut June 29th, and when well cured, weighed as follows:

Plot No. 1, ...	121 lbs.
" " 2, ...	179 "
" " 3, ...	151 "
" " 4, ...	164 "
" " 5, ...	55 "

As my statements for the years 1862 and 1863 gave the amount of crops and mode of cultivation for those years, I will now give you only the amount of produce of each plot, with its estimated value for each of the three years. In the following estimate, corn on the ear is valued at $1 ; rye, $2.60 ; hay, $1 ; corn fodder and straw, 50 cents—per cwt.

1862.	Plot No. 1,	257 lbs. corn,	$2 57	
"	"	177 lbs. stover,	89—	$3 46
1863.	"	79 lbs. rye,	2 05	
"	"	128 lbs. straw,	64—	2 69
1864.	"	129 lbs. hay,		1 29
Total value on Plot No. 1 for three years,				$7 44

1862.	Plot No. 1,	286 lbs. corn,	$2 86	
"	"	202 lbs. stover,	1 01—	$3 87
1863.	"	86 lbs. rye,	2 24	
"	"	140 lbs. straw,	70—	2 94
1864.	"	174 lbs. hay,		1 74
Total value on Plot No. 2 for three years,				$8 55

1862.	Plot No. 3,	277 lbs. corn,	$2 77	
"	"	194 lbs. stover,	97—	$3 74
1863.	"	86 lbs. rye,	2 24	
"	"	134 lbs. straw,	67—	2 91
1864.	"	151 lbs. hay,		1 51
Total value on Plot No. 3 for three years,				$8 16

1862.	Plot No. 4,	242 lbs. corn,	$2 42	
"	"	169 lbs. stover,	85—	$3 27
1863.	"	61 lbs. rye,	1 59	
"	"	100 lbs. straw,	50—	2 09
1864.	"	164 lbs. hay,		1 64
Total value on Plot No. 4 for three years,				$7 00

1862.	Plot No. 5,	165 lbs. corn,	$1 65	
"	"	105 lbs. stover,	53—	$2 18
1863.	"	8 lbs. rye,	21	
"	"	15 lbs. straw,	08—	29
1864.	"	55 lbs. hay,		55
Total value on Plot No. 5 for three years,				$3 02

RECAPITULATION.

Total value on Plot No. 1, manure ploughed in 7 inches deep,	$7 44

Do. No. 2, cross-ploughed in 4 inches deep,	$8 55
Do. No. 3, harrowed in,	8 16
Do. No. 4, spread upon the surface,	7 00
Do. No. 5, no manure applied,	3 02

From the foregoing it would appear that Plot No. 2, where the manure was cross-ploughed in, has made the largest return: 39 cents more than Plot No. 3, where the manure was harrowed in; $1.11 more than Plot No. 1, where the manure was spread upon the sward and ploughed in seven inches deep; $1.55 more than Plot No. 4, where the manure was left upon the surface; $5.53 more than Plot No. 5, without any manure. The rye and clover upon Plot No. 5, being winter-killed, reduced the value of that plot very materially, and it would appear that to cultivate our Plymouth County soils without any manures is a *very* unprofitable mode of farming.

VINEYARDS.

WORCESTER NORTH.

Report of the Committee.

Ever since "Noah began to be a husbandman, and planted a vineyard," the grape has occupied a place more or less prominent among the cultivated fruits in some portions of almost every civilized country. Growing, (as history informs us,) in its highest perfection in Syria and Asia—this luscious fruit and the unrivalled beverage it produced, early recommended it to the special notice of the patriarchal tillers of the soil, who planted vineyards long before any considerable attention was given to the cultivation of other varieties of fruit. As civilization advanced, the vine accompanied it first to Egypt, Greece, and Sicily, and subsequently to Italy, Spain, France, and Britain, to which latter place it was introduced by the Romans about two hundred years after the Christian era. The grapes of the old world were celebrated for their excellent wine-producing qualities, and the products of vineyards, in the same localities at the present day, still retain this distinguishing characteristic.

In France the cultivation of the vine is very extensive. Goodrich informs us, that 5,000,000 acres are devoted to that object, and that the estimated value of the products in 1854, amounted to $130,000,000. Although in no other country is there so large a part of the territory devoted to this object, still, in nearly all the minor States of Europe the grape furnishes no inconsiderable part of the products of the soil. Plants and seeds of foreign varieties were brought to this country by colonists during the first fifty years after its settlement, but no considerable attention seems to have been given to their propagation until after the close of the Revolutionary War. After our forefathers had succeeded in throwing off the British yoke, and obtained a name among the nations, their attention began to be more especially directed to the cultivation of various kinds of fruit. Among these (though not the most prominent,) was the grape. Experience soon showed that these foreign varieties would not withstand the severity of our stern New England winters without protection; and that our short and variable summers, and early autumnal frosts, presented an insurmountable barrier to their successful cultivation, (except under glass.)

These efforts in relation to grapes of foreign origin having thus far failed, the attention of the fruit grower has been wisely directed to the examination of our more hardy native varieties. These, especially such as are found growing on the borders of our New England streams, are more or less characterized by the hardness of their pulp and a peculiar foxy flavor which renders them as a dessert fruit, somewhat unpalatable. Experience however has shown that these objectionable qualities are susceptible of being materially modified by cultivation. By a careful selection of the most promising for propagation and by reproduction, several new varieties have been obtained within the last few years of acknowledged excellence, and well adapted to our New England climate. Among those now propagated in this vicinity, (more or less approved,) are the Concord, Delaware, Hartford Prolific, Diana, Rebecca, and Early Amber.

The two first of the above-named are undoubtedly the best and most profitable for the market, possessing the three important qualities of being hardy, good bearers, and holding their fruit well. Several other new varieties, not yet fully tested, have recently been brought to notice. Rogers' *Hybrid* and Grant's *Iona* and *Israella*, are all highly recommended and will no doubt soon occupy a high position in the catalogue. In most of the Middle, and some of the South-Western States, vineyards on something of an extended scale have within a few years been planted and are now under successful cultivation. Many valuable varieties which cannot be successfully grown in New England, succeed well on the banks of the Ohio. The Catawba seems to take the lead in that locality, producing an abundant crop of well-ripened fruit, and richly rewarding the husbandman for his labor. In California, also, where the vine, even in its wild, uncultivated state, bears the choicest fruit, vineyards have within a few years past been planted, which are said to produce in abundance grapes unsurpassed both in size and in flavor. This will undoubtedly eventually become one of the largest fruit-growing States in this country. Wine has already been produced there, which is said to compare favorably with the best of foreign importation.

These unmistakable demonstrations in regard to the propagation and improvement of our native grapes will, we trust, be a sufficient guarantee for awakening in the minds of this community, a much livelier interest on this subject—that instead of one vineyard (without a competitor,) entered the present year, there may be found in 1865 a goodly number to contend for the promised awards.

It need scarce be said, that in selecting a site for a vineyard in this latitude, a warm sunny exposure should always be secured. A spot somewhat elevated above the surrounding level, sloping a little to the south or south-east is the best. It should also be one not liable to be affected by the early frost, otherwise the crop will be in danger of being cut off before coming to maturity. All cultivators of the vine agree that a light, dry, warm soil is the best. If it can be found, a soil composed of decaying calcareous rocks should be selected. This should be well worked to the depth of eighteen inches at least, and enriched with well decomposed manure to which should be added, (if not already contained in the soil,) some portion of lime and crushed bones—some wood ashes will also be beneficial, especially in a dry season. If the ground is well prepared and enriched at the outset, an annual top-dressing will be all that will be required to keep the vineyard in a flourishing and healthy condition for two or three years.

Although much has been written and said in regard to the best method for cultivating the grape, we apprehend, by a large part of the community, the subject is still very imperfectly understood. Any careful observer cannot fail to notice, that most of the vines planted in our gardens, and about our dwellings, have been suffered to retain all their native habits. Instead of being judiciously trimmed and properly trained, as they should be every year, they are permitted to grow unmolested, not only about the arbor or trellis provided for their accommodation, but if by chance a tree comes within their reach, they are allowed to stretch forth their tendrils to the nearest twigs, and thus find ample means to assist them in their rambles, and gratify all their roving propensities. All who suffer their vines thus to wander unmolested, have good reason to expect their crop will be a failure. Every grape-grower, whether on a larger or smaller scale, for the vineyard or garden, should have a suitable trellis or arbor, beyond which the vine should never be suffered to climb. Late in autumn after the vine has shed its leaves, or in the early part of winter, it should be properly trimmed; and, if so situated that it can be conveniently done, be taken from the trellis and laid on the ground to remain through the winter, with some slight covering to hold it in place. This is all the protection that will be required for the hardy varieties, to enable them to withstand the most severe winter. Early in the spring before the buds have become much swollen, they should be taken up and carefully arranged again on the trellis, there to be trained through the growing and fruiting season. For further reliable information in relation to this subject, see the very full and clear statement of Dr. Fisher.

The committee have attended to the duty assigned them, by carefully examining the only vineyard presented, finding it highly satisfactory in regard to the location, general arrangement, and mode of cultivation, and in a flourishing and healthy condition.

CYRUS THURSTON, *Chairman.*

Statement of Dr. Jabez Fisher.

The specific plantation of native grapes which I enter for premium, consists of sixty-one vines, set six feet apart and trained upon a single trellis. The whole number are Concords, and were planted in the summer of 1861, having been grown from single eyes, started in pots under glass the previous March. An under-drain was put in directly underneath where the vines were afterward set. The ditch was dug three feet deep, and the throat of the drain formed by placing flat stones like the two sides of a steep roof upon the bottom. Stones and rubbish were then filled in to within fifteen inches of the surface. Fresh bones, with the flesh attached, were spread liberally upon the rubbish and the earth levelled. The soil is a strong, deep loam, on a somewhat retentive bottom, having a south-easterly slope. The row runs very nearly north and south, the vines being planted on the east side of the trellis about a foot distant, and leaning towards it.

In the autumn of 1861, the vines were all cut down to within two or three buds of the ground and left without protection. In the spring of 1862 a trellis was built of posts and wire. The posts were chestnut, 2 by 2, except one at each end, which was 3 by 5, and braced in a foot. The posts were set ten feet apart, two and a half feet deep, and were dipped in gas tar before setting. I would now set them but six feet apart. Four strands of No. 12, annealed, iron wire were attached to the posts by staples made of the same wire. The lowest wire is 18 inches from the ground, and the others are placed at distances of 14 inches, so that the top wire is just five feet from the surface of the soil. These wires are coated with paraffine varnish to keep them from rusting. During the summer of 1862 a single shoot was trained perpendicularly from each vine, all other growth being rubbed off as soon as it started, and all laterals were pinched back to one leaf, and this operation was repeated and continued as long as they made new growth.

In the autumn of 1862 the first vine at one end of the row was cut off at the third wire of the trellis. The second vine was cut at the first or bottom wire, the third vine at the third wire, the fourth at the first wire, and the remainder in the same way, alternating between the first and third wire. Any vine that had not made a good growth was again cut back again, as in 1861, nearly to the ground. None of them received any protection during the winter but remained attached to the trellis the same as during growth. In the summer of 1863 a shoot was taken from each of the two upper buds, and trained horizontally along the first or third wire as the case might be, in opposite directions, each vine forming a T. No other growth was allowed, and the laterals on these horizontal shoots or arms were pinched back as they had previously been on the upright shoots the year before. These arms were allowed to bear one or two clusters of fruit each, according to their strength.

In the autumn of 1863 the arms were cut back, varying with their condition, but where they had grown vigorously, from two to four feet were left. Everything else was removed so that the vines showed nothing but a stick in the form of the letter T. No winter protection was used. The training during the past summer, 1864, has been as follows: From each of the horizontal arms, upright shoots have been allowed to grow as often as every nine inches on the average, the intention being to have eight upright shoots or spurs upon each arm, when the latter shall have reached its full length of six feet. The shoots from the buds on the end of the arms, were trained horizontally for the purpose of extending them. As soon as the clusters of fruit-buds on the upright spurs were sufficiently developed to show their character, the end of the shoot was pinched off so as to leave but one leaf beyond the last good cluster, all small or imperfect ones being removed. If the spur showed no fruit, it was allowed to grow all the same, and was pinched at about the same length, or a little shorter. When these spurs had grown sufficiently, they were tied to the second or fourth wires, as they belonged to the lower or upper set of vines. The horizontal shoots from the end of the arms were allowed to grow until they had met the adjoining ones, and two or three joints beyond, at which point they were pinched off. It would be more correct to say that they were pinched off at seven feet from the upright stem of the vine. All laterals, wherever found, were successively pinched off as often as they made a new growth, so as to leave but one additional leaf only each time.

The vines have been pruned this autumn as follows: The horizontal shoot which is now the continuation of the arm, was cut off at five feet and about eight inches from the central stem.

Each upright spur is cut off so as to leave but two buds, not counting the undeveloped buds around the junction of the spur with the arm. The ground has all this time been cultivated with a horse-hoe, except the space between the trellis and the trunks of the vines, which is kept loose by the hand-hoe.

To exhibit this mode of treatment in full, it will be necessary to give the proposed operations for one year more. The vines are to be laid upon the ground, before it freezes up permanently, and kept there by a little soil thrown upon them. Next spring, just before the buds start, they are to be tied to the trellis, and from the upright spurs, the upper bud will be allowed to grow and show fruit. If from any cause this bud fails to start, the lower one will take its place, but otherwise the latter will be rubbed off. One of the best of the base buds which were only partially developed the autumn previous, will be permitted to grow, while all the others are to be rubbed off. Both these shoots will be tied to the wire immediately above, and pinched off the same as the past season. That portion of the arm which grew the past summer, will form spurs precisely as the first portion has already done. In the autumn of 1865 the old upright spur, with the shoot that has grown from its top bud, bearing fruit, will be cut entirely away, leaving only the shoot that grows from the bud at the base, and that shoot, or spur as it will then be, will be cut back, leaving but two buds as before. The spurs on the end of the arm, are to be pruned in the same manner, and then the vine is fully established, the same course of pruning and training being followed out year after year.

My reasons for adopting this method and its advantages over others, I will endeavor to give briefly. It is very well known that whoever plants a grape-vine in a fair soil, gets, the third, fourth or fifth year, one or two very fine crops, but after this time the fruit depreciates in size and quantity, and although the vine may be sufficiently vigorous, the crop seldom equals that of its earlier years. The reason I conceive to be this: When a vine is three or four years old it makes a growth of wood, varying from two to ten or more feet in length on the different shoots. The best fruit buds are somewhere near the centre of these shoots. Everybody knows that it is common practice to prune grape-vines every winter, but without a thought of the why, one cuts one way and one another. The usual plan is to employ in substance one of two modes. One consists in cutting out a portion of the long shoots or canes entirely, the other in cutting off the greater length of all the canes. In the first case there will be a good show of fruit the following year, because a part of the best fruit-buds are left, but if the same system be followed out for a few years, the vine requires more and more room to spread itself in every direction. The best fruit is borne at a distance from the centre, and mostly at the top of the vine if any portion of it grows upright, and after a few years the parts of the vine nearest the root become barren, and the fruit is borne only at the extremities. This system must finally run out for want of room, and will not answer for vineyard cultivation.

In the second plan above mentioned, if all the shoots are cut away for the most of their length, the best fruit buds are lost, and the result is necessarily a poor crop. The vine extends continually, but more slowly than in the other case and is otherwise less satisfactory.

To overcome these difficulties, that is, to get strong fruit-buds, and at the same time to keep the vine always at home, I have adopted the plan described. I am not aware that anything connected with it is original with me, for it has been in use essentially for many years. Its practical working is this: As the strength of a vine is expended principally at its extreme ends or top, the whole vine is made to be the top by the system of horizontal arms from which the upright fruit-bearing spurs grow, no one having any special advantage over another. The two arms being of equal length and bearing the same number of spurs are equally balanced. The effect of pinching off the ends of the bearing shoots early in their growth, is to cause the remaining buds in the axils of the leaves, which are to produce fruit in the following year, to rapidly develop, and form fine, large fruit-buds. The continual pinching of laterals prevents the vine from neglecting these buds during the whole of the growing season. The same causes also operate to develop the fruit which is upon the same spur, and it grows very large and ripens evenly and early. Another effect produced is, that the leaves that are left to grow, being few in number, grow very large and healthy. A single large leaf is of more value than a number of small ones, and is more able to resist disease, and especially premature decay. When we come to prune in the autumn, although we are obliged to cut away some very fine buds, yet the second one from the base of the spur is nearly or quite as good as any of those removed, and will give very fine clusters. Many of mine this year weighed upwards of thirteen ounces each. The principal advantage, even above all the others, is that the vine is always kept within a small compass, and is a permanent affair; inasmuch as it will bear as much fruit, and carry as much foliage at five or six years, as at fifty or one hundred. I think that the special efforts of the grape-grower should always be directed to producing the buds for his future crop, the present one being already mostly beyond his control.

I have not usually given the Concord any winter protection; it is generally so well ripened and so hardy in its nature, as to endure ordinary winter weather without protection; but in unfavorable seasons it is liable to be insufficiently ripened to withstand the influence of extreme cold without suffering, and in such cases there follows a partial or even a total failure of a crop. In fact, the winter of 1860–1, showing a temperature of 22° below zero on the 8th day of February, killed all the wood which stood above the snow-line on that day. This might not have happened, and probably would not, if the wood had been well ripened in the autumn previous. The autumn of 1860 was very wet, and slightly cooler than the average of seasons, and the foliage of grape-vines and even apple-trees was killed by a severe freeze on the first day of October, while still green and growing. Vines planted in the way I have described, can be easily laid down at a cost of not more than one day's labor of a man and a boy for an acre, which is a very cheap insurance, considering the risk of so valuable a crop. My vines are planted on the east side of the trellis, a foot from it, and are trained in a slanting direction to the lower wire. Above that point they are carried up on the west side of the trellis, so that when pruned, and the ties cut, they fall toward the ground on the west side by their own weight. A boy can hold them down, while a man throws three or four shovelfuls of soil upon them to hold them in place.

Although I have entered and described the vines trained to a single trellis, yet it is in most respects like fifteen others in the same vineyard, except that about one-half of them are one year behind in the time of planting the vines. A portion of it was originally planted for other and different modes of training, all of which I became convinced must fail in the end. I therefore replanted with young vines, rather than attempt to retain the old ones, and removed the latter last autumn to give way to the former. In so doing, I sacrificed the prospect of a crop of some tons of grapes this year, feeling that the end justified the means, and that the longer I put off the sacrifice, the greater it would be.

I think it is an erroneous idea that a grape-vine necessarily requires a very rich soil for its successful culture. My vineyard has had no manure other than the bones before mentioned, for four or five years, and is now too rich for the Concord, which comprises ninety-five per cent. of my vines. Some of the slower-growing varieties require a considerably better soil. A soil too rich in fertility forces an enormous growth of wood, every shoot of which must be pinched back, thus vastly increasing the labor without any compensating result. If this pinching is neglected the succeeding crop will be more or less a failure. A rather poor soil is preferable for this reason, and if too much so to produce satisfactory growth, a top-dressing will be a sufficient means of obviating that difficulty. In view of these considerations, I would not trench or plough the land for a vineyard of Concord grapes more than twelve inches deep. I prefer that in this latitude, where the heat of the five growing months, from May 1st, to September 30th, averages only 64.11 degrees, that the great majority of the roots should lie near the surface. A dry bottom, however, either through natural or artificial drainage, is essential to the seasonable maturity of both wood and fruit.

It may be proper to state that although the vineyard is now of four summers' growth, yet it was planted with vines one year younger than are ever purchased for that purpose.

GRAIN CROPS.

WORCESTER NORTH.

Statement of Lewis A. Goodrich.

CORN.—The soil on which I raised my corn offered for premium, is clayey loam. It was in grass in 1863, and was manured with eighteen loads of barnyard manure, of thirty bushels to a load, two hundred pounds of plaster, and two hundred pounds of superphosphate. It was ploughed in November, 1863, and in spring for present crop, four to six inches deep, and harrowed one way, in May; the cost of ploughing and other preparation was $8; the manure cost $3, and was spread and harrowed in; the plaster and phosphate cost $8, and were dropped in hills about three feet apart, and the corn dropped on that. The cost of seed and planting was $6. The cultivator was run through, and it was hoed twice, costing about $10. It was harvested from the 15th to the 20th of September, by being cut and stooked in the field until dried; the cost of harvesting and husking was $7. The whole cost is $69 for the acre. Amount of stover, four tons; the weight on one acre was 4,440 pounds of shelled corn or 79$\frac{16}{56}$ bushels.

Statement of Cyrus Kilburn.

WINTER WHEAT.—I raised my wheat on a clayey loam soil, ploughed about seven inches deep. I applied only one barrel of superphosphate, and September 22d sowed two bushels of blue-stem winter wheat, and cradled it the last of July. The crop was injured by the Timothy grass sown with it. By repeated experiments I am convinced that no grass seed should be sown with winter wheat till the next spring; the grass being more hardy will start first and check the wheat. I think this an important item in the successful cultivation of winter wheat. The amount of wheat was twenty-four bushels to the acre, and about one ton of straw.

Cost of phosphate, ...	$7 00
" " ploughing, ...	5 00
" " seed and sowing, . . .	8 00
" " harvesting, ...	6 00
	$26 00

Statement of Alonzo P. Goodridge.

RYE.—The soil on which I raised my spring rye was a sandy loam, on which in 1862 and 1863 I raised corn; and was ploughed six inches deep, and rye sowed about the 1st of May; one and one-fourth bushels of seed were used to the acre; it was reaped 26th of July, and the acre yielded 1,600 pounds, being about 28½ bushels to the acre.

Cost of ploughing, ...	$3 00
" " sowing, ...	3 00
" " seed,.	2 00
" " harvesting, ...	6 00
	$14 00

NANTUCKET.

Statement of Charles W. Gardner.

CORN.—Having entered as a competitor for the premium for the best experiment in raising Indian corn, I will say that the land is a sandy loam, that has been in grass for the last fifteen years,—last year produced about one-half ton to the acre. The piece contains about six acres; but the worms have troubled a part of it so badly, that I will enter but three acres. Last February I commenced carting and spreading barn manure, composted with peat muck and soil, forty loads to the acre, each load containing twenty bushels. Ploughed the first of April, five inches deep; planted from the 15th to the 21st of May, in hills three and one-half feet apart each way. My object in spreading the manure so early in the season is that it costs less, and that the manure gets more thoroughly mixed with the soil, and the after-crops are more even than when the manure is dropped in heaps and spread at ploughing.

RESULT IN CROP.

385 bushels ears, worth 90 cents per bushel, . .	$346 50
2½ tons top-stalks, worth $10 per ton, . . .	25 00
3 tons butts and husks, worth $6 per ton, . .	18 00
	$389 50

COST OF CULTIVATION.

Cost of manure, 120 loads,	$60 00	
Ploughing,	9 00	
Seed and planting,	8 00	
Cultivating twice,	4 00	
Hoeing,	3 00	
Interest on land,	3 60	
Cost of harvesting and husking,	14 00	
		$101 60
Net profit,		$287 90

ROOTS AND VEGETABLES.

MIDDLESEX.

From the Report of the Committee on Vegetables.

The ground that actuated your committee in their awards was this: asking ourselves what sized vegetables we should select for our own consumption, all, with one accord, said, the well-matured, medium-sized,—not too small, for there is too much work in preparing them for the table,—not too large, for they are coarse and woody, unfit for eating, and are not as salable in any market for culinary uses. This opinion is fully sustained by all market-men, and by the committee.

Therefore the committee took into consideration this view of the subject: Does the awarding of premiums for monstrosities or freaks of nature tend in any way to promote agriculture? The answer was, no. The question then arises: How can the desired end be promoted? We answer in part by giving written statements in full,—of which too many are so meagre that they hardly come within the rules of the society,—of the kinds of soil on which they were raised, the kind and quality of manure as well as the quantity, and whether they are a fair sample of the crops exhibited, or selected from a field or the garden; time of sowing, culture, distance between the plants, and the different varieties of vegetables best adapted for different soils. These questions, for questions they are in reality, if minutely and correctly answered, would do more good, in our opinion, than all the premiums ever paid by this society since its formation for overgrown vegetables.

J. B. Farmer, *for the Committee.*

NANTUCKET.

Statement of David Folger.

Beets.—After so much has been said and written upon root-crops, and especially the mangel, by those whose knowledge and experience ought to entitle them to credit, as one of the most important crops for a dairy-farm, there still exists a strong prejudice against feeding them extensively. Knowing that this prejudice has gained ground among us, leads me to extend my remarks beyond the limits of an ordinary statement of the results of a crop entered for premium. After eight years of experience in feeding mangels, I feel prepared to meet any objections against their extensive use as a succulent on all dairy farms, whether for the production of milk, or the manufacture of that milk into butter. The milk is better and the butter sweeter and of a better color from their use than without. There is also a large saving in hay, for the cow that has eaten a half bushel of beets in the morning, will eat much less hay during the day. In fact, there is a large saving also, in the growth of this crop; as the mangels grown upon one-fourth of an acre of land, will do more towards wintering stock, than the hay grown upon four times the breadth of land, the same amount of manure being used in both cases. There are many varieties of this family of beet, but after trying several, I give the yellow globe the preference, as I think it keeps better far into the spring than any other. I do not think the yield so large as that of the long red, but have no doubt they contain more nutriment. They should be planted in rich, mellow soil, well manured, and thoroughly pulverized. Plenty of room should be given each plant, for I consider it more profitable and far preferable to raise large vegetables than small ones, and beets in particular do not do as well, if not carefully thinned early in the season. They can be readily transplanted, and it is my practice to fill in all the spaces in this way.

My crop this year would have been larger had there been wet enough to transplant. As it was I had four hundred bushels, worth thirty cents per bushel, making $120, at a cost of $36.65. A few words in regard to feeding this vegetable. I think they should never be used before the 15th of January; later would be better. Many farmers no doubt have been led to discard them from too early feeding.

The seed was planted about the 1st of May, and the crop harvested the last week in October.

NOTE.—There were several statements on roots returned to the societies, as for instance, at Nantucket and elsewhere, but the quantity of manure was not stated. Thirty *loads* of manure in Nantucket means nothing to speak of in Berkshire, and as the value of a statement depends mainly on the quantity of manure, it is worthless with this item left out. Competitors should remember that the *load* is not a sealed measure. A cord is a *load*, and so is a bushel *for a wheelbarrow !*

MILCH COWS.

ESSEX.

From the Report of the Committee.

DAIRY.—We regard inquiry in relation to these two subjects, quantity of milk produced and the value of milk for butter, as of special importance to the farmers of this county. Every farmer may have an *opinion* as to the amount of milk his cows give in a year, and also how many quarts of that milk it will take for a pound of butter; but very few *know* from trial what their cows average, or what is the general quality of the milk.

There is far too little knowledge of the cost of keeping our cows, and the best manner of keeping them, especially among those farmers who furnish milk for the market. The production of milk is fast becoming one of the leading agricultural interests of the county. The rise and increase of manufacturing cities and villages have created a large demand for milk; and, as the population increases, the production of butter will become less and the quantity of milk raised for market greater. This change in dairy farming calls for a change in the kind of stock, and in its management. Cows that are profitable for butter, will, perhaps, hardly pay the expense of keeping at the wholesale price of milk; and the reverse is equally true.

We need careful and repeated experiments to show us what breed is *best for our purpose*, and how cows should be kept to secure the largest return at the least outlay. In old butter-making times, but little butter was made in the winter, and the cows would thrive better that season on the hay and other fodder produced by the farmer. But the milk-producer must keep his quantity of milk in winter nearly equal to that of summer; consequently he must bestow extra care, and must use considerable extra feed. The kind, quantity, and manner of using this extra feed is unsettled, and opinions among practical farmers vary much. The only way to settle these matters is by careful, patient experiment. And then how little is known of the amount of milk our cows produce. One man tells you cows generally do not average more than five quarts per day; another thinks a cow very poor if she will not average *eight* on like keeping. Perhaps it may not be out of place here to state the result of a trial made by the chairman of your committee a year or two since.

The object was to ascertain how much an average cow would give, on fair keeping, and how much difference there was between such a cow and the best. Accordingly three cows were selected which had been kept upon the place several seasons, and whose qualities were therefore known, and which calved, as nearly as possible, at the same time. No. 1 was a cow that had always been considered a fair milker; No. 2 was one of the best,—both natives; No. 3 was a grade Ayrshire.

No. 1 calved April 12th, and the 22d of the next March.

No. 2 calved April 25th, and the 19th of the next April.

No. 3 calved June 10th. and the 21st of the next June.

The milk was measured carefully every Wednesday, and the amount reckoned an average for the week. The following was the result:

MONTHS.	AMOUNT OF MILK.			QUARTS PER DAY.		
	1.	2.	3.	1.	2.	3.
	Qts.	Qts.	Qts.			
April,	171	47	–	9	$9\frac{1}{2}$	–
May,	314	345	–	$10\frac{1}{8}$	$11\frac{1}{8}$	–
June,	308	406	345	$19\frac{1}{4}$	$13\frac{1}{2}$	18
July,	290	320	427	$9\frac{1}{3}$	$10\frac{1}{3}$	$13\frac{4}{5}$
August,	273	305	395	$8\frac{5}{6}$	$9\frac{5}{6}$	$12\frac{5}{6}$
September,	231	298	334	$7\frac{2}{3}$	10	$11\frac{1}{6}$
October,	194	279	357	$6\frac{1}{4}$	9	$11\frac{1}{2}$
November,	171	259	296	$5\frac{2}{3}$	$8\frac{2}{3}$	$9\frac{7}{8}$
December,	104	247	310	$3\frac{1}{3}$	8	10
January,	46	250	326	2	8	$10\frac{1}{2}$
February,	–	190	295	–	$6\frac{5}{6}$	$10\frac{1}{2}$
March,	–	54	270	–	3	$8\frac{2}{3}$
April,	–	–	169	–	–	$5\frac{2}{3}$
May,	–	–	41	–	–	3
Total,	2,102	3,000	3,565	–	–	–

Average amount per day during the whole time: No. 1, 6.2; No. 2, 8.5; No. 3, 9.4. The milk was sold at wholesale, and actually brought,—No. 1, $52.47; No. 2, $79.71; No. 3, $97.57. The keeping in each case was precisely alike, and consisted of a few roots or shorts, with as much hay and other fodder as they would eat. During the summer months, nothing but good pasture. It was thought at the time that Cow No. 1 barely paid the cost of keeping and a fair interest on her market value. Taking this for granted, then No. 3 paid a profit over cost of keeping, sufficient to buy a good cow at that time.

Dr. Loomis, in a paper published in the Patent Office Report of 1861, estimates the average annual amount of milk produced over a large extent of territory, at only 1,800 quarts per cow. If this is correct, or even if 2,100 quarts per year be the average, then it follows that many farmers are making milk at little or no profit. It also follows that with better stock, the same expense in keeping will yield a larger return than in almost any other branch of agriculture. Doubtless it is practically impossible for all to obtain extra cows; but when farmers are convinced that they cannot afford to keep a medium cow, the demand for better stock will increase, and the supply will increase with the demand. Another important consideration is, that every part of this county is so near a market that all kinds of fodder fit for cattle will always command their value in money. Hence there is no *necessity* for keeping stock to eat up our fodder as there is in towns farther back. The kind and amount of food most economical and suitable for milch cows during winter, is a matter scarcely less important to the milk producer than the kind of stock.

The whole subject affords a wide field for investigation and experiment, and we hope that next year some of our farmers will *observe* and *make note* of what they are doing, not only for their own but the public good.

JOSEPH S. HOWE, *for the Committee.*

MIDDLESEX.

In making a report on herds of cattle, or milch cows, blood stock and kindred topics, certain great salient facts and prominent points ought to be repeated and insisted upon from year to year. The attention of cattle breeders and farmers cannot be too often called to them.

Cattle, instead of bankrupting the soil, give back as much richness as they take from it. They afford the readiest means of keeping up the fertility of a farm, and generally a cattle district grows richer every day, while a grain district, without the introduction of foreign manures, at great cost, grows poorer.

Here in Middlesex County cattle-breeding is receiving every year more and more attention, so that our soil, sterile as it is, compared with other portions of the country, is in no danger of exhaustion. Our herds, like our farms, are small, but by careful attention to breeding and by means of blood stock, our farmers can show cattle equal to the best. The great object with us is to convert grass into milk, and the cow that does this most effectually is the cow for the Middlesex farmer.

It is computed that in this State fifty-two per cent. of the milk is consumed as food, while forty per cent. is manufactured into butter, and eight into cheese. In this county, doubtless, a larger per cent. of milk is consumed as food. After making all due allowances, milk as an article of consumption for food is of much more importance than its manufacture into cheese. Milk used as food must be produced near its place of consumption. Few, even of those engaged in raising or feeding live stock, are aware of the enormous value of this source of the farmers' wealth and the proportion it bears to the other products of the soil.

Suppose that by judicious selections, an infusion of better breeds and a more accurate knowledge of the principles and practice of breeding and feeding stock, we could add twenty per cent. to the profit of our animals in early maturity and in an increased product of milk, butter, or beef, we should have an annual additional value equal to that derived from an increased capital of six hundred millions. We, in New England, cannot raise such splendid herds as graze the blue-grass regions of the West. Our object is rather the production of milk; the feeding of cattle for the pail, rather than the shambles, although beef here as elsewhere, is the ultimate end of cattle.

It is now many years since our agriculturists have turned their attention to the improvement of the native cattle by crossing them with blood stock, and already the most happy results have been attained. This is evident from the better quality and earlier maturity of the stock sent to our great Eastern markets, from the cattle-raising districts of the West, to say nothing of the evidences of improvement nearer home.

Our so-called natives spring from a mass of mongrel blood and ill-assorted races. With such an origin, of course they can possess no fixed hereditary traits, and no reliance can be placed upon them as breeders. Hence, the general introduction of blood stock among us constitutes a most important era in our agricultural history. We have every variety of climate, soil, and vegetable product, within the compass of our vast territory, which extends through twenty-five degrees of latitude and fifty-six of longitude, including nearly the whole temperate zone. Hence, every variety of cattle can be naturalized and made to flourish here.

In New England, the Ayrshire and its grades seem best adapted to the soil and the wants of the people, which demand a liberal supply of milk as an article of consumption for food. We have crossed the Ayrshires with our native stock, with the happiest results, so far as our dairies are concerned. The small, fawn-like Jersey cow, of the Channel Islands, has been naturalized here, and her milk, so rich in butyraceous particles, imparts its golden hue to our butter. It is well understood that one or more of these Jersey cows should be present in every herd, at least where butter is one of the principal objects in view. In fact no breed seems to have sprung into greater favor within the last few years. Large herds of this breed of cattle are still rare.

Probably that exhibited by Mr. Hurd, of Concord, will vie in point of numbers and excellence with any other in the country. And in this connection the committee cannot but express a regret that the fine herd of Jerseys, belonging to Mr. Reed, of Tewksbury, were not on exhibition. The committee also regret that they did not have the pleasure of seeing the fine herd of Ayrshires, belonging to George W. Lyman, Esq., of Waltham, as these two herds would have added greatly to the interest of the show.

In this county, the Ayrshire cow for milk, and the Jersey for butter, are exactly adapted to our scant pastures and climate. The Middlesex farmer, your committee are proud to say, houses his cattle, as a general rule, in the most sumptuous manner. Our barns are generally all that they should be, furnishing warm and comfortable shelter to the live stock in winter.

In a report on the subject of milch cows, (foreign breed,) which the chairman of your committee had the honor to submit to the Middlesex North Agricultural Society last year, he said: "The barns of New England form a most important feature in their agriculture. Thousands are annually built on the most approved plan, for the storing of hay and other crops, and for the shelter of cattle and the saving of manure. In this Commonwealth alone, in 1860, there were 84,327 barns, an increase of more than ten thousand during the ten preceding years." Our farmers now generally treat their cattle in the matter of feed, shelter, &c., as they should be treated.

They cannot own vast herds, like the stock-growers of the West; their farms are too small; but their stock, though few in numbers, can be brought by careful breeding, to a high degree of perfection. As has been said, the production of milk is the great object with us, although, of course, it is desirable that our cows when given up as milkers should take on flesh readily. Mr. Flint, in his able and exhaustive work on the Milch Cow, has gathered and digested all the information extant in relation to the dairy and dairy animals. This work has been most widely diffused, with the happiest results. It is a manual which should be in every farmer's possession.

PETER LAWSON, *for Committee.*

Statement of C. W. Smith.

I offer for the society's premium my herd of cattle, consisting of a bull, seven cows, and a heifer. The bull is Ayrshire. The cows and heifer are grades, with the exception of two natives. The grades are crossed with Devon, Durham, Ayrshire, and Dutch blood. Two of them I raised myself, one was raised in Lexington, by Andrew Wellington, one in Concord from G. M. Barrett's stock, and the rest were raised in New Hampshire. Two of the herd are eight years old, two of them are six years old, two four years old, and one three. Their feed in winter has been swale hay and corn fodder, with about a peck of turnips, and from one to two quarts of cob meal per day. In summer they have common pasturing; when the feed is very short, I give them one feed of green corn fodder or millet per day, but no grain of any kind. The quantity of milk given by each cow, soon after calving, is as follows: No. 1, 23 quarts per day; No. 2, 19 quarts; No. 3, 18 quarts; No. 4, 18 quarts; No. 5, 15 quarts; No. 6, 14 quarts; No. 7, (the heifer,) 12 quarts.

The quality of their milk is above the average. We churned three meals of their milk this week, and made at the rate of 45 pounds of very extra butter in seven days.

Three of them have been in milk eight months; two of them five months; the others came in the present month.

The profits of my dairy I cannot state very accurately. I have sold my milk for 30 cents per can of 8½ quarts.

I claim that my cows are superior for quantity and quality of milk.

WALTHAM, September 28. 1864.

Statement of John C. Dillon.

I offer for your award my herd of cattle, consisting of eight milch cows and heifers, one yearling heifer, and three heifer calves, viz.:

TABULAR STATEMENT.

Name.	Where Raised.	Breed.	Age.	Quarts of Milk.	Percentage of Cream.	Date of Trial.	Date of Calving.
1. Duchess of Orleans,	Waltham,	½ Ayrshire,	7 years,	20¼	15	June 10,	May 10.
2. Susie, . . .	Waltham,	½ Ayrshire,	5 years,	17¾	14	May 15,	April 15.
3. Minnehaha, . .	Wayland,	½ Ayrshire,	6 years,	18½	14	May 23,	April 23.
4. Cherry, . . .	Wayland,	½ Ayrshire,	6 years,	17½	13	June 6,	May 6.
5. Josey, . . .	Weston,	Mixed,	5 years,	16¼	14	June 8,	May 8.
6. Beauty, . . .	Weston,	½ Ayrshire,	4 years,	17½	11½	Sept. 1, '63,	Aug. 14, '63.
7. Jenny, . . .	Weston,	½ Ayrshire,	3 years,	11¼	10	June 10,	Feb. 5.
8. Mary, . . .	Concord,	⅞ Ayrshire,	3 years,	14	9	July 1,	June 14.
9. *Belle, . . .	Weston,	¾ Ayrshire,	15 mos. 20 dys.	–	–	–	–
10. †Rose, . . .	Weston,	¾ Ayrshire,	5 mos. 5 dys.	–	–	–	–
11 ‡Lady Constance, .	Weston,	¾ Ayrshire,	4 mos. 10 dys.	–	–	–	–
12. §Daisy, . . .	Weston,	½ Ayrshire,	4 mos. 12 dys.	–	–	–	–

* Belle is from Duchess, and was sired by Mr. Giles' premium seven-eighths Ayrshire bull.

† Rose is from Susie, and was sired by the premium Ayrshire bull, "Zero."

‡ Lady Constance is from Duchess, and was also sired by "Zero."

§ Daisy is from Josey, and was sired by Mr. George Dunn's Ayrshire bull.

At and preceding the date of trial, the cows have had only fair pasture, and were kept in the barn at night. I must except Beauty, whose yield last fall is returned; her feed was good pasture, with green corn at night, and a quart of Indian meal each morning.

In reply to the fourth question: my cows' food in winter has consisted of English hay and corn-stalks while milking, and meadow and swale hay and barley straw while dry. This summer they have had only a good and sweet, but rather overstocked pasture, with a very little green corn fodder since the 24th of July. Last year each cow had a quart of corn meal every morning until she began to dry up, when by degrees the meal was discontinued. This season the cows have not had any grain, and owing to the oppressive drought, much of the fodder corn, on which I depended to help out their pasture, dried up, and was of little value; and some younger corn which I was beginning to feed, was entirely cut down by a severe frost. In fact, the cows have, as their appearance will testify, had rather a hard time of it; and their produce is only creditable when considered in reference to their keeping.

As to my management and method of feeding: my attention is directed in the first place to keeping my stock at all times comfortable and contented. This, in summer, is usually a pretty easy task, and has consisted with me in furnishing them a good, fair pasture and an occasional change of bite, and in providing a sufficiency of fodder corn to eke out their pasture feed during the months of August and September. I bring the cows up at six, P. M., when they are milked and remain in the barn all night. I milk again at five, A. M., and then let the cows out for the day.

There is a cellar under my barn into which the manure is dropped through scuttles, and from time to time I throw through these same scuttles, sandy loam, in the proportion of two loads of sand to one load of manure. On wet days in the fall, this is thrown over into the front of the cellar and thoroughly mixed, and after standing a short time to drain, is drawn out and spread on my reclaimed meadow. The cellar floor is then covered about three inches deep with well seasoned peat muck, and receives the manure of the cows during the winter; and also dry mud, as nearly as I can estimate, a load of mud to a load of manure. This last manure, when thrown over and thoroughly mixed, I spread broadcast and plough in in the spring, for planting; and, used in this way, I consider the compost nearly, if not quite as valuable, load for load, as clear manure.

About the time the fodder corn fails, the pumpkins begin to come in; and with these, of which I give each cow about half a peck a day, and the after-grass on my mowing land, I keep my cows in good heart and milking condition till I take them into the barn for the winter. After this, being earlier or later in different seasons, my practice is to feed with good English hay, corn-stalks, and the remainder of the pumpkins and a few small potatoes, till about the middle of January, when I begin to dry up the cows which are to calve early in the spring.

I have hitherto usually milked my cows till within a month or six weeks of their time of calving; but from some experiments I have made, I am inclined to think it will be found more profitable to allow them a longer rest. At the same time I think it advisable to milk a heifer nearly up to the time of her having her second calf; believing that if allowed to go dry a long time the first season, she might wish a still longer rest afterwards; whereas, if milked nearly up to her time of calving again, she will in subsequent pregnancies give milk a shorter or longer time, according to her food and treatment.

In the winter I milk at six, A. M.; then give a foddering of hay, (the poorest I am feeding;) at about eight, I feed again, and about nine, turn out to water, leaving them out a longer or shorter time, according to the state of the weather. I now clean out the barn and arrange the bedding. If the weather be cold, they will return as soon as they have drunk, when I give them another foddering, and while they are eating it I give them a gentle carding, and then leave them till three o'clock.

I have heard some sneer at and others doubt the economy of the time spent in carding cattle. I believe it pays pecuniarily, and if I knew it did not, I should (if I could afford time,) continue to do it, thinking myself amply rewarded for the trouble by the improved appearance of my stock, and the loving look I receive from each cow, as she stretches on tip-toe and curls her tail on her back at my approach.

At three, I feed again, and at four, if the weather is not very inclement, again turn out to water and fix up the barn. When the cows return they find a nice mouthful in their cribs, and at six, are milked again, and afterwards receive a good supply of the poorer kind of fodder for their consideration during the night. If the weather be warm, the cows will frequently remain out the greater part of the day; and, sometimes, on very cold days, I only let them out once, about noon; in these cases their times of feeding are of course varied to meet the circumstances. Before feeding, I always clean out the cribs, throwing aside whatever may be left for litter, with which, either in the shape of refuse hay or sawdust, I keep them always moderately supplied. At intervals of a week or ten days, I give each cow a half peck to a peck of small potatoes raw, as an alterative, and every three or four days I give each about an ounce of salt.

About a week before I expect each cow to calve, I put her at night into a good-sized, well-littered pen, but do not otherwise vary her treatment. Three days after calving I begin to give her better feed, and, if all be well, in five days I consider my milk factories in good working order, and supply them with materials accordingly. The calves, if destined for the butcher, are allowed to suck the cows till they are sold; if to be raised, I usually let them suck once, and afterwards feed them from the pail with new milk till they are two weeks old, when, by degrees, skimmed milk is substituted for the new, and at about six weeks their allowance of milk is gradually lessened to about two quarts per day, which is continued to them till nearly the time for taking them into the barn. This is my usual system, and the one I prefer; but this fall my milkman has been so pressing for all the milk I could spare, that I have rather stinted my calves, which have had nothing but pasture since the twenty-fourth of July.

I cannot state the precise quantity of butter made from my cows in one week, as I have given my milkman the privilege (of which he has fully availed himself,) of using me as a reserve, and taking from one to ten cans a day, at a day's notice.

The superior qualities I claim for my herd, are, a more than average yield of milk and butter, good, healthy constitutions, and kind and docile tempers; and lastly, that they are well calculated, with judicious care in the selection of a bull, to produce dairy stock, "native and to the manor born," and "adapted to the peculiaries of soil, climate and physical conformations of Middlesex County." The sentences marked as quotations were appropriated as being peculiarly expressive, from Mr. Lawson's report in 1862, and from this and other writings of that gentleman; and also from remarks of Messrs. Flint, Goodale and others.

I have been led to think it may not only be interesting but profitable, to endeavor by judicious management and without any unprofitable outlay, to assist in producing a Middlesex breed of cows equal to the world-renowned Ayrshire, Hereford, Durham and the Channel Islands. My theory, at starting, is a very old one, and is, simply, that a good milker, descended from a good milker, and sired by a pure-bred bull of a good milking stock, will, if put to a pure-bred bull of the same or another good milking race, produce calves of which the heifers will in all probability inherit the excellencies of their mother; and that the longer any good qualities can be shown to have existed in both lines of ancestry without deviations, the more certainty may we expect such qualities to be transmitted to each successive generation.

Minor matters, such as color, size, form, horns, &c., are mere matters of fancy, and each will endeavor to please his own taste; still, by degrees, opinions will become more unanimous, as the best cattle will, even in these matters, eventually set the fashion. I need scarcely add that my own judgment,—confirmed by the authorities I have quoted,—leads me to prefer the Ayrshire bull, as the most eligible cross for the production of dairy cattle suited to this section.

I have sold from my cows since the fair last year, seven hundred and seventy-six pounds of butter, for two hundred and forty dollars and fifty-six cents; eight hundred and thirty-five cans of milk, containing eighteen hundred gallons and one-half, for two hundred and forty-one dollars and fifty-three cents; and four calves for twenty-seven dollars. I think I am quite within the mark in estimating the butter and milk used in my family at seventy dollars more, and I value the three calves I am raising at fifteen dollars each. The above items, amounting together to six hundred and twenty-four dollars and nine cents, are all the precisely appreciable produce of my stock. Besides this must be considered the value of the skim-milk and buttermilk for the hogs, the manure for the land, and last, but not least, the pleasure I derive from witnessing the prosperity and comfort of my stock, and the gratitude and affection they evince in return for the attention I bestow on them. The greater part of the work about my cows in summer, and the whole in winter, —during four months of which I keep no help,—is performed by myself.

Year by year, for the last five years, I have increased the number of my stock, in spite of my neighbors' indignant admonitions that I never should be able to keep them; still, my cattle looked a little better than the average. I have always had hay to sell in the spring, and each year have had in tillage more land and sold more marketing than the preceding one. At last my secret was found out: "he half keeps them on grain." It was in vain for me to protest that I never gave a cow more than a quart of grain a day, or that I always sold more hay than would pay for their grain. I was condemned. I therefore determined, no less for my own satisfaction than for that of my neighbors, to try whether I really was dependent on my miller or not. In one sense, the experiment will be a most satisfactory one, as I certainly cannot be taunted with peculiarly good fortune in choice of a season, and my cows still live. At the same time, I do not feel inclined to continue my present treatment, believing,—with the approval of good authorities,—that two cans of milk per day from one cow, are far more profitable than the same quantity from two; and that *we cannot expect a cow to return us any more milk or butter than we furnish her materials for.*

WESTON, September 19, 1864.

Statement of Joseph L. Hurd.

My cows in the winter were fed with fair English hay and cut feed, giving each cow two quarts of corn meal per day. The bulls received not over a quart per day. In summer the milch cows and bull "Don" have been fed principally on green fodder, southern corn and oats having been sown for that purpose.

They have been allowed to run two hours in the pasture in the morning, and one hour in the evening. My feed, owing to the drouth, having given out, they have, at times, been kept out all day. The pastures suffering from the same cause, the cows have received four quarts of cob and corn meal per day.

All my Jersey cattle are stabled every night, excepting "Prince Albert" and "Abraham," who are kept out all summer, excepting when brought in for a short time for some special reason.

For quantity of milk, I have only tried "Victoria," "Nellie" and "Beauty," who, in full flow, average about eighteen quarts per day, the first giving eighteen and a half, and the others seventeen and three-quarters each.

Quantity of butter I cannot state, but I claim that the cows exhibited by me give a very large quantity of exceedingly rich milk.

The only known profit that I have yet derived from my herd is the pleasure that I have experienced in seeing them and exhibiting them to others. I expect, however, by next season to realize a profit from the sales of the stock,—offers that I have had for many of my animals justifying that expectation.

CONCORD, September 22, 1864.

Statement of George M. Barrett.

The herd of cattle that I offer for examination and premium, were all raised in Concord but one; she, by Lyman, of Waltham. The herd consists of seven cows and a bull.

No. 1.—Breed, Ayrshire; 7 years old, calved Oct. 1, 1863.

No. 2.—Breed, Ayrshire; 7 years old, calved Oct. 5, 1863.

No. 3.—Breed, Ayrshire; 4 years old, calved April 5, 1864.

No. 4.—Breed, Ayrshire; 8 years old, calved Nov. 10, 1863.

No. 5.—Breed, $\frac{15}{16}$ Ayrshire, $\frac{1}{16}$ native; 6 years old, calved March 10, 1864.

No. 6.—Breed, $\frac{15}{16}$ Ayrshire, $\frac{1}{16}$ native; 4 years old, calved April 8, 1864.

No. 7.—Breed, native; 6 years old, calved Oct. 8, 1863.

No. 8.—Bull, breed, Ayrshire; 4 years old, weight, 1,180 pounds.

The four cows that are forward with calf, were wintered partly on meadow and partly English hay, with two quarts of shorts and one quart of peanut meal per day, and have run at pasture this summer. The other three were wintered on meadow hay, and have run at pasture this summer, with very short, dry feed. The bull has been kept most of the time on meadow hay, with a little meal about two months of the time, and has been worked.

No. 1, gave last October, 20½ quarts per day; 18 per cent. cream.

No. 2, gave last October, 18 quarts per day; 13 per cent. cream.

No. 3, gave last June, 19 quarts per day; 12 per cent. cream.

No. 4, gave last November, 17½ quarts per day; 12 per cent. cream.

No. 5, gave last June, 18 quarts per day; 11 per cent. cream.

No. 6, gave last June, 18 quarts per day; 11 per cent. cream.

No. 7, gave last October, 19 quarts per day; her milk was good; the precise percentage of cream I do not know.

I claim superiority for the quantity and quality of their milk. They were all raised by me, except No. 4 and No. 7; No. 4 was raised by Lyman, of Waltham, and No. 7, by Tuttle, of Concord. Nos. 1, 2, 4, and 7, were milked until July, and gave from eight to ten quarts, each, per day, in June. The other three are giving, two of them $10\frac{1}{2}$, the other, 12 quarts per day, now.

CONCORD, September 22, 1864.

PLYMOUTH.

From the Report of the Committee.

The herd of Nahum Stetson, Esq., of Bridgewater, seven in number, (including those for exhibition,) were mainly blood-stock, and show conclusively that he has spared no pains for a series of years in perfecting his stock for the dairy.

The herd of grade Jerseys of the Messrs. Pratt, of Middleborough, were very fine cows. Three of this herd are from a very superior native cow, purchased at the auction sale of the Hon. Daniel Webster, crossed with the full-blood Jerseys. The other cow was three-fourths Jersey, from Mr. Hobart's imported stock. The milk from all these cows is very rich.

The first premium for the best cow was awarded to Charles N. Martin, of West Bridgewater, grade Jersey, six years old, a most perfect model of a cow; calved June 7th. From the 5th to 15th of September she gave 224 lbs. of milk, which produced $16\frac{1}{4}$ lbs. of butter. She was fed on grass, and one quart of meal per day.

We noticed two of the Kerry breed for exhibition by the Hon. Charles G. Davis. This breed of cattle are from Killarney District, south of Ireland. When a year old, they are turned out in large numbers on a common, a mountainous, barren region, comparatively, where they graze throughout the year; they remain there until nearly full grown, when they are collected and disposed of to drovers, are then driven north, and sold; are a very hardy race, generally dark color, or black, and reputed to be great milkers.

Seth Bryant, Esq., of East Bridgewater, presented a full-blooded Jersey for exhibition, sixteen years old, which he imported, and we have no doubt the cow has paid a greater income than any one in the county. The owner informed us that she had kept in better condition, and has done better the past season than she ever has.

Two-thirds of the dairy stock present were full-blood or grade Jerseys, showing that the public are being divested of whatever prejudices there may have been against that breed of cattle, at least, so far as to give them a trial, and we have yet to learn a single instance where there has been a trial of them for dairy purposes that has not been satisfactory.

We are informed by Harrison Staples, Esq., of Lakeville, who received premiums on two full-blood Jersey cows, that, previous to purchasing them, he had three cows which were considered very good; after he purchased the Jerseys they were all five milked together, and there was a decided improvement in the butter made.

A large part of the milk in the county is used for making butter; hence the importance of introducing rich milkers.

NO FARMER OUGHT TO REST SATISFIED WITH A COMMON AVERAGE COW, BUT STRIVE FOR THE VERY BEST, having in view the purpose for which the milk is to be used.

In purchasing, how often a few dollars extra would secure a valuable cow, which, if we obtained only a few additional quarts of milk daily, it would be net income over and above the annual expense of keeping; or, instead of the penny wise, we should adopt the pound foolish operation, by paying a few dollars less, we obtain one which just pays for keeping.

And we very much doubt if a majority of the cows in our county ever have paid their keeping. True, there may be good cows, which, owing to the scanty fare they have had, have not developed their milking qualities so as to show what they really are.

In connection with the statements in regard to those cows which yield large quantities of milk, rich for the dairy, we have heard the question raised, How would they do in our comparatively barren pastures? By such questions we are reminded of what is said of the prospects of the hay crop, almost every season: "It will be very heavy on lands in good condition, but old meadows will be light." It would be a miracle if otherwise. So in reference to a cow if turned to a pasture where she would have to feed from morning until night, and a scanty allowance at that, if she should yield anything like a remunerative supply of milk.

Whatever breed of cows we have, if they are great milkers, and kept in good condition, they must have an abundance of succulent food and roots—the higher the keeping the richer the milk, and better the health of the cow.

EPHRAIM B. THOMPSON, *Chairman.*

NANTUCKET.

From the Report of the Committee.

In the stock presented there were peculiarities which incline your committee to make some general observations. With three exceptions there was not a blood animal exhibited. Neither were there any cases of pure-bred cows. The cows were what are called natives. Of late years there has been improvement by crossing with Ayrshires, but we saw none that were above half-blood. To the mind of a person understanding the benefits of either pure breeds or a mixture of half-and-half of two pure breeds, as half Shorthorn and half Ayrshire, or half Alderney and half Shorthorn, these cows brought regret. As natives, they were very good. Some of them would produce as much milk, with the same feeding, as blood cows. But when you come to their progeny, how little you can rely upon it. The calf may take after a grandsire of the scrub race, or a kicking or otherwise worthless grandmother. This is why we hear continually from farmers the story of such and such a heifer being far less promising than the mother, and of the disappointment this result has occasioned. The progeny of native cows cannot be relied on. There is no certainty that they will follow in good points the dam. And here is just the precise difference between blood stock and that which has no pedigree.

Now what should a farmer do in relation to procuring profitable stock. In the first place we must remember that his milch cows are only so many machines to turn his grass into gold. Therefore there are certain things beyond the mere milking capacity which are important. When a cow has become too old to be profitable as a milker, it is then important to profitably prepare her for the butcher. There are milch cows in Massachusetts which sell readily for slaughter, after they have ceased to be profitable for the dairy, for more than a hundred dollars each. If these cows would fatten for thirty or forty dollars,—which they would,—then the breeders get sixty or seventy dollars clear on a cow, while the raisers of poor mongrel stock get nothing.

So that the thriving farmer will look to milk first, and then to the capacity to take on flesh. A prudent merchant would pay but little for a ship that he could not at some future time repair and make valuable for some other business. So he who purchases a house looks to see if it can be repaired without costing more than it is worth.

By what we have said, it will readily be perceived that your committee are in favor of blood stock for profit.

The next question that arises is, "Among the various blood stock, which is best?" We answer this by saying that each one exceeds the other under certain circumstances. The question then with us is, Which is best for poor, or at least, very ordinary pastures? that is, in a few words, which is best for Nantucket?

With good feed, a very ordinary cow may be made a respectable milker. With poor feed, the best cow will utterly fail. The farmer then should first look at his own means of feeding. The Shorthorn cow is heavy; it is troublesome to her to travel; she requires thick grass; in fact, she wants to be "up to her knees in clover," and then she will pay most richly, both as a milker and for the butcher. But it would be the height of folly for a farmer, who has only poor pastures, to buy Shorthorns.

The Ayrshires are lighter on the foot, more nimble, capable of enduring severer winters, and of recuperating readily in the spring. As milkers they produce a larger quantity of milk and butter, in proportion to the food they eat, than any other of the pure breeds. Like all other cows, natives as well as pure breeds, they will make poor things on starvation. These, however, will be very good cows, and perhaps the very best, for the thin and meagre pasturage of Nantucket.

The Jerseys have their peculiarities. For richness of milk, and the butter made from it, no pure breed can excel them. Some say that they require more tender care than the Ayrshires, but, to breed in with natives that are good milkers, a very superior cow would *probably* be produced. We say "probably," because no mongrel cow will certainly produce a good milker, however excellent the mother may be. Yet, to cross good natives with any of the pure breeds, the chance of getting a good milker is increased more than fourfold. For poor pastures and hard winters, they are not equal, as is said by some breeders, to the Ayrshires. Other as reputable breeders, say that no cow exceeds the Jerseys in hardiness. A farmer, with a herd of Ayrshires, or Ayrshire grades, could not do better than to have a Jersey or two to color and flavor his milk and butter. For a private gentleman, the Jersey is far superior to any other cow.

The Devon is not usually a good milker. The Devon, crossed with our native cow, would be good for a mere stock raiser. For working oxen and the shambles, they are very valuable. Their beef is excellent. No beef is sweeter, and none so well "mixed."

But the best milkers, in proportion to their size and food, are grade Ayrshires. A cross obtained from an Ayrshire bull, and a pure-bred Shorthorn produces a stock that for beauty, for the milk-pail, and, at last, to take on fat readily, would be hard to beat. It is a most excellent and profitable stock for Nantucket, if a farmer has good pasture lots for fall feed, and raises roots enough to mess them through the winter. A cow of this kind, owned by Isaac Macy, Esq., is the most beautiful animal in appearance, and the best milker of her age in the county.

There are about fifteen thousand acres of poor pasture land in Nantucket, fenced and unfenced, exclusive of mowing lots. The climate is usually mild. From present indications farming has got to take the place of whaling in a very great degree. Ploughing the land, instead of ploughing the sea has yet to be very much the means of support. It becomes all, then, to look thus early to the improvement of their stock, so that Nantucket may soon be as famous for its excellent cattle and good blood, as the islands on the British coast, or the valleys of England or Scotland.

We have said that care does much to make the cow. Milk is not, as the Scotch have it, all "made through the mouth;" good feeding is not all. To have your cows, whether natives or bloods, do their best, there are certain other requisites.

1st. They should have a warm barn.

2d. That barn should be cleaned often.

3d. The cows should be fed regularly; that is, at regular hours.

4th. They should be milked and managed with all gentleness.

5th. They should never be forced to remain out in the cold, or starve.

6th. They should be "curried" every morning.

7th. They should be milked dry every time, and by a milker that milks quickly but tenderly.

We will say a few words now in regard to selecting cows. They are meant to apply to native cows, as blood cows, or pure crosses, need no great selection. We only mean to allude to those marks easily found and readily seen; marks which any careless farmer may observe.

First, for Nantucket, the cow should not be over large. Her hinder quarters should be larger than her fore. She should have a large, soft bag. Her milk veins which come out of the bag, and lead along and go up into her belly about half way between her fore legs and hind ones, should be large, and the more zig-zag and knotted, the better. The whole cow should be in the shape of a wedge, her head and shoulders being thin, and the thickest part across the hips, looking over the back. It would be a good sign to have her wedge-shaped the other way, too; her head being the point, and the very thickest part from the hip bones down to the bottom of the bag, or udder. Let her have a small head, a slim tail, a bright eye, and mild countenance. As to the milk mirror of Guénon, there is no doubt; and to a person of sharp perception, and one who has looked at it and studied it carefully, it is a great guide. All good milkers have it large, and some poor milkers. These, however, may have been made poor milkers, by neglect in some way, or by disease.

James Thompson, Esq., the president of the society, has purchased a small lot of Jersey cows, and a thoroughbred Jersey bull. Here is, perhaps, the only chance for pure-breeds, and as pure-breeds are so much more reliable for profit than natives, we hope every farmer will get as much of this stock as possible. These animals of the president's are from the very best Jersey stock, and as it will be impossible from so small a lot to get pure-bloods very fast, it is to be hoped every farmer will hurry to get half-breeds, and commence "breeding in," as soon as possible. You can now have your choice between an Ayrshire and a Jersey bull, and if you have but a single cow, and she a native and a good milker, the quicker you raise a half Jersey or half Ayrshire calf, the sooner you will have a cow that not only will give more milk than the mother, but better milk also.

There were a number of Galloway cows, or Buffalo cows, as they are called, and one took the premium as a milker. These cows have been generally good, but as they are of no particular breed, there is no use in any farmer breaking his neck to get the calf of one, however good she may be, for like all other mixed and bloodless stock, there is no certainty that the calf will in any way resemble its mother, except in lack of horns.

We will close this somewhat extended report with a quotation from the report of the North Worcester committee of 1863: "It is true that thoroughbred animals are yet so scarce that all cannot avail themselves of the thoroughbred cows, but all or nearly all can use pure-bred bulls, and no man can *afford* to patronize a native, so-called, when he intends to rear his calves, and where the services of a pure-bred can be had for a reasonable advance from natives or grades. It will pay the farmer when he intends his calves for veal, as the increased weight with the form will generally insure a sufficient remuneration for the extra outlay. Before closing, lest any undervalue a pedigree, allow us to state that the value of a pedigree consists in its *guarantee* that the animal *is* of the race or breed claimed, and has in itself the power of transmitting the qualities for which it is itself noted, and that the longer the pedigree, the quality being the same, the more sure your animal is to transmit its qualities. As the object of all agricultural societies is to improve our agricultural interest, it becomes a question of importance whether we should offer premiums for grade or mongrel bulls at all, for, by so doing, we are encouraging the rearing of inferior animals."

EDWARD M. GARDNER, *Chairman.*

HORSES.

WORCESTER WEST.

From the Report of the Committee.

In addition to the award of premiums I propose to give to the society my ideas of the breeds and classes of horses most deserving attention and encouragement in Massachusetts, and what is the best mode of rearing them. In doing this I do not expect to meet the views of the members of this society or of other societies that are engaged in raising to any great extent, as all have their favorite breeds; neither do I expect to give you a particular description or history of all the valuable breeds of horses in New England,—there is no animal on which there is more difference of opinion than on the horse. The Morgan horse has been reared with success in Vermont, and to some extent in Massachusetts, and is a hardy animal. His constitution is well adapted to our climate.

The Morgan combines all that seems necessary to make a good horse, being of medium size and powerful action,—a good feeder,—possessing docility of disposition, and maturing at an early age. I frequently hear an objection made against the Morgans that they lack in size ; that objection is easily obviated by crossing; but when you have done that you do not have the Morgan horse. Then comes the question: do we get, by crossing, as good a horse as we do in the full-blood Morgan ? What we gain in size do we not lose in symmetry, compactness, ease of motion, and vigor ? I think not, if crossed with the right breeds, although I think a larger horse than the medium size of the race of the animal is attended with a loss of power and action, and should not be permitted, except for special purposes, and with pure or full bloods.

The Messenger horses have been reared quite extensively in Maine, and with great profit to many of the down-east farmers. The Messenger horse is much larger in size,—more rangy, but does not mature as young as the Morgan ; but when matured they are capable of great endurance, and are usually of good disposition. I have known many Morgans and Messengers that were fast trotters.

I am informed that the famous trotting stallion "General Knox," which created quite a sensation at the New England Fair, held in Springfield the present month, was a cross of Messenger and Morgan, and I have no hesitancy in saying that I think him to be the finest trotting stallion I ever saw.

The Black Hawks are not second to any breed of horse reared in this country; they make fine carriage and saddle horses, and for style and action are not surpassed. They are fine-limbed and active, good roadsters and fine drivers, but not well adapted for the farm or draught. The Black Hawks are a branch, or originated from the family of the Morgan horses, and they partake largely of the vigor and action of the Morgans.

The Hamiltonians have been raised with much success in Northern New York, and have gained a good reputation,—I might say, become celebrated. It is enough to recommend them, that they are of the Messenger family, but they are not so much sought for in Massachusetts as either of the above-named breeds I have mentioned.

The classes of horses to be considered, are, first, the stock horse; second, the brood mare. First, the stock horse—like begets like, and a good stock horse is indispensable in propagating good stock, and without him our efforts to raise good horses could not be crowned with much success. Second, a brood mare is very important, and good mares should be used in breeding. It is too much the practice of farmers to put mares to breeding after they become broken down and are unfit to be used for general work. That is a great mistake, and should be corrected; to raise a good colt the sire and dam should be of good symmetry, and the practice of using a sire much larger than the dam, so far as I have noticed, has not been attended with good results. They should be of nearly equal size, the sire a little the largest. By taking pains in propagating with the sire and dam, colts will be raised that will be of a profit to the farmer and a pleasure to look upon as they are growing to maturity.

The family horse is almost one of the indispensables; but very few would be willing to be deprived of the services of this noble animal. A horse of this class should be trained to the saddle as well as the carriage, as he is hardly a family horse unless he can be used under the saddle. He should also be of docile disposition, and great care should be observed in selecting a horse for this use, as he should be a good roadster, with fair speed, life, ambition, and be a good feeder, with a good disposition, well broken; all combined makes a good horse, and is most desirable and profitable.

There are many other families of horses that I might speak of, such as the Indian Chiefs, Drews, Fox Horses, English Hunters, &c. Of classes there is the trotter and the racer, which have their friends and their enemies. They have more enemies in words than in acts, and when a race is to come off, all are there; those who denounced it are there; all classes of citizens are there; men of all professions are represented, and are interested,—all enjoy it.

To have a good horse, get good stock to commence with, that will produce a good colt. Keep well, train when young, do not work him hard while young, and you will have a good horse.

HENRY SMITH, *Chairman.*

NANTUCKET.

The stock of young horses, on the whole, looked very well, but we would urge upon the people of Nantucket to give more attention than they have heretofore done to the raising of this noble animal. The great demand for horses at the present time, caused by the destructive tendencies of the lamentable civil war in which our country is now engaged, should be an inducement to all to do their part towards making the supply in some degree commensurate with the demand. But we want horses of the right stamp; not the ill-framed, diseased, puny, lifeless animals which are so often seen, but horses of good blood, with strong, vigorous frames, betokening that man appreciates that they are designed to be used, and not abused, by himself.

A good sound horse must, like a good sound man, have good parents capable of giving birth to a healthy offspring. The time has gone by when horse breeders can hope for success, when they take for a breeding mare one that has already been worn down by hard and laborious service. Only those animals should be allowed to procreate which are of good form, in perfect health, of easy movement, and free from vicious habits. Too much attention cannot be given to this matter, and we enjoin upon our farmers to give heed to the teachings of all physical laws with reference to this point.

Then, too, the training is of the utmost importance. Probably no people in the world are more particular in their care of this noble servant of man than the Arabs. As soon as the colt is born they bestow upon it the utmost care. It is fed with regularity, and has its home in the family tent. Subjected to the kindest treatment, it learns nothing but docility, and obedience to its master's commands becomes a part of its nature. No regular system of breaking is necessary, for it is always ready at call to do whatever may be required. Our mode of life renders the system of course somewhat different, but we may well pattern after those wild men of the desert in watchful solicitude for the young animal. The treatment should invariably be kind and gentle, and the course of training should be based upon the presumption that the colt is docile and willing to do. As in training a young child, impatience should be banished from the mind of the teacher. If the young horse is shy, a little kindly soothing will prove far more effectual than the lash; and by a resolute but mild treatment, his disposition may be moulded as the master may desire.

The horse is an animal quick to learn, and he will readily perceive if he is driven by one who does not feel within himself a controlling power. Hence we should never allow a young horse to be driven by a person of a timid or vacillating disposition. The germ of future trouble would, in that case, be surely sown.

In conclusion, we would suggest that the society should procure some horse for the use of the people of the town by which our stock may be improved. The market must, for a long series of years, be far better than it has ever been before, and if we would compete with people abroad, it behooves us to see that we begin aright. The best blood will produce the best animal, and the expense of raising, does not vary materially, whether a good or a poor horse is to be the result. From pecuniary consideration, if from no other, we trust that this suggestion will be carefully weighed.

AUGUSTUS FRANKLIN, *for the Committee.*

SHEEP HUSBANDRY.

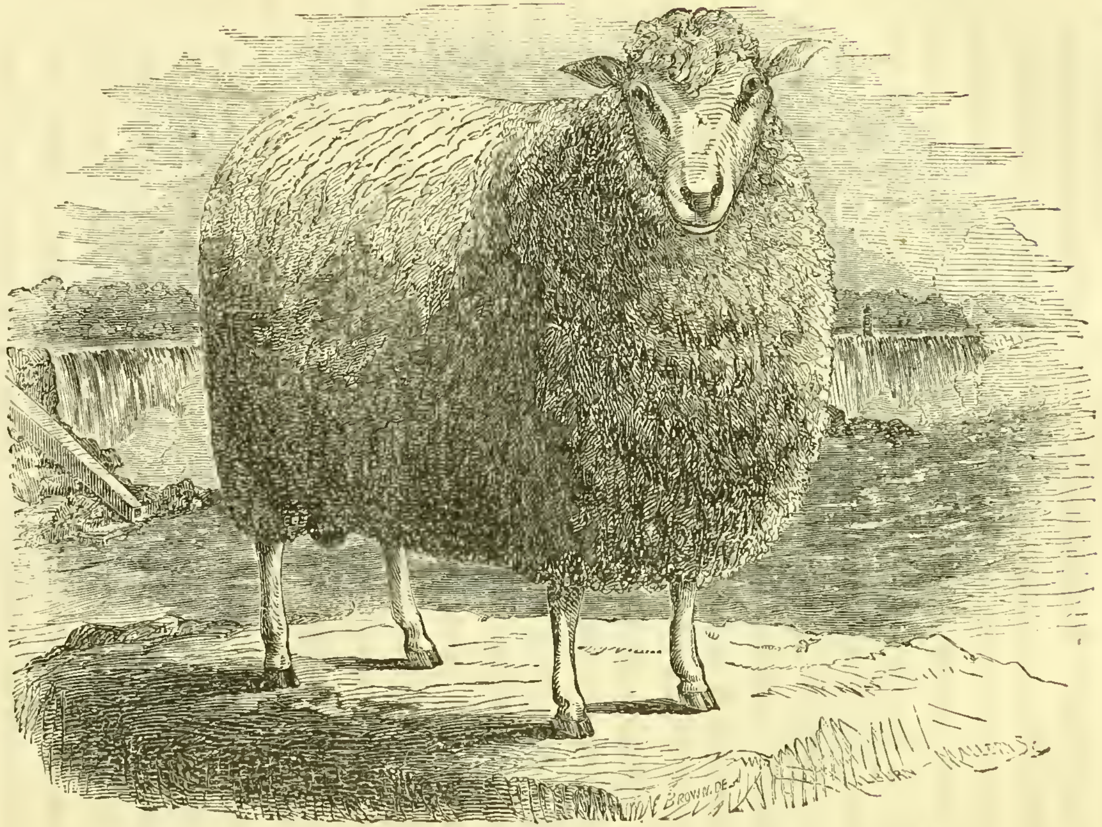
MIDDLESEX SOUTH.

From an Address by George S. Boutwell.

I have selected this topic for this occasion because I am quite sure that Massachusetts, and possibly our county and neighborhood, may engage, profitably in sheep husbandry.

There are two classes of subjects on which a man may write with profit,—those that he understands thoroughly, and those that he is ignorant of entirely. If his subject is of the first class, he will interest his hearers and readers. If it is of the second he is sure, in the preparation of his papers, to educate and improve himself. If, however, a man undertakes to write upon a subject with which he is well acquainted, but yet has never carefully studied, his conclusions and opinions answer to the average conclusions and opinions of those who listen, and hence but little advantage is obtained by anybody. My present claim to consideration is due to the fact that I enter upon the discussion of a subject, of which I had as little knowledge as can be assumed of any one; and if, therefore, you fail to obtain instruction I ask you to believe, whether the address gives evidence one way or the other, that I know more of sheep husbandry than when I entered upon the present investigation. I have read several elaborate essays from the antiquated article on sheep in Rees' Cyclopædia, to a comparatively recent paper prepared by Prof. Wilson, of Edinborough, and published in the Transactions of the New York Agricultural Society for 1858. These discussions are too minute for repetition here. They are largely devoted to different breeds of sheep, many of which have never been introduced into this country, and many also that are not esteemed anywhere. It is a noticeable fact that the article in Rees' Cyclopædia contains nearly everything that is found in the papers of modern writers. The value of the Southdown sheep seems to have been as well understood at the commencement of this century as now, though the breed has been greatly improved within fifty years.

It is to be assumed, I suppose, that every one knows a sheep, though there are children in the public schools of the State, and



"NIAGARA." Cotswold Buck, owned by CHARLES CORLISS, of Haverhill, Mass.

probably in the schools of the county, who have never seen the animal. The origin of the domestic sheep is not known, though it is presumed to have been in Asia or Africa, and the wilds of both countries now abound with animals from which the domestic sheep may have sprung.

It is generally conceded that civilization has improved the disposition, manners, flesh and fleece of the race. In a wild state the sheep is usually furnished with horns, is covered with coarse wool or hair, and the flesh resembles that of the goat. The size of a domestic sheep varies from less than one hundred to nearly four hundred pounds, live weight, but neither the quality of the flesh nor the value of the fleece is proportionate to the weight of the animal.

As a general fact in Great Britain, the largest sheep are found in the highly cultivated lowland counties, and the smaller ones upon the mountains. It is probable, however, that in Great Britain, at the present time, the favorite breeds are introduced, and raised with tolerable success, in all sections.

These seem to be the Southdowns, under various local names, and the Leicesters and Lincolnshires. The Southdowns are distinguished for the economy with which they may be kept, for their fattening properties, for the quality of wool, and for their peaceful character. They still command large prices, and within the last fifty years, single bucks have been let by the year in Great Britain for fabulous sums of money; say from five hundred to six thousand dollars. An offspring of this breed called the Oxfordshire Downs, has been introduced into this country, and is a favorite with sheep raisers generally.

In this State they are more known in Essex and Plymouth Counties than elsewhere. They appear to have attracted notice in England about eighty years ago, and were thus described by a writer of that period. They have no horns, but grey faces and legs, fine bones, long small necks, rather low before, high on the shoulders, and light in the fore-quarters, sides good, loins tolerably broad, backbone rather high, thigh full, twist good, mutton fine in grain, and well flavored. Wool short, close and fine, and in the length of staple from two to three inches. Weight, per quarter, of wethers two years old, eighteen pounds. This would give a total live weight of one hundred and forty or one hundred and fifty pounds.

By careful selections and judicious crossings, the Southdowns have been much increased in size and improved in quality.

The qualities of good sheep have been thus stated. Head small, neck thin and short, eyes gentle and bright, breast and shoulders wide and broad, straight and deep carcase or barrel, feet and bones small, joints short, muscles plump and full, skin a dark-red or slate-color, wool of a yellow white, curly, of moderate length and thickly set, the fat and flesh soft, with some degree of firmness in handling, the countenance pleasant and inclined to quietness. Good judges avoid sheep that have short and thick heads, neck long, thick and concave in the higher part, carcases long and thin, chests contracted, flesh thin, feet large, flesh hard in handling, wool coarse and hempy, and countenance unpleasant.

The Lincolnshire breed are larger than the original Southdowns, the former weighing about twenty-five per cent. more than the latter. It is quite likely that the original difference does not now exist. The wool of these animals is often from ten to eighteen inches in length, and yields twelve to eighteen pounds to the fleece.

The Leicester is a variety rather than a breed. The live weight of a Leicester is from one hundred and fifty to one hundred and seventy-five pounds for ewes of three years, and wethers often weigh two hundred pounds at two years of age. If value is put upon the head and pluck, skin and tallow, as well as upon the wool and flesh, the loss in weight by killing and dressing is from ten to seventeen per cent. The Leicester is a long-woolled sheep, with flesh more finely grained than any other long-wool variety, and it is supposed to be the product of a cross between the Lincolnshire and the Ryeland. When the Spanish Merinos were introduced into England, a resemblance was observed between them and the native Ryeland, which led to the conjecture that the latter were really Spanish sheep, introduced by the Phœnicians many centuries before, when those early navigators had colonies in Spain and Britain.

The breed of sheep now most highly prized in Massachusetts, is the Oxfordshire Downs. This, it is claimed, is the product of a cross between the Cotswold and the pure Southdowns.

The breed was introduced into the State by Mr. Fay, of Lynn. It is however to be said that at the close of the last century the pure Cotswold was a mythical rather than a known variety of sheep in Great Britain. In Oxfordshire the name was preserved and applied to a variety that was in truth a mixture of two or three kinds. The Cotswolds are represented as among the larger varieties of the island, often weighing thirty and occasionally forty or fifty pounds to the quarter, yielding a fleece of from eleven to fourteen pounds weight, and usually producing two lambs in a season. The wool of the Cotswold is long, and that of the pure Southdown short and fine. By the crossing, the Oxfordshire Down yields a heavier fleece and produces more mutton than the pure Southdown.

Before the improvements of the present century the pure Southdown weighed from one hundred to one hundred and forty pounds alive, and yielded two and a half pounds of wool at a shearing, while the Cotswold, as then known, weighed fifty per cent. more and produced a fleece of nine pounds, while the average of the Lincolnshire was eleven pounds of longer and coarser staple.

In 1854, Mr. Fay exhibited two imported bucks at the Essex fair that weighed over two hundred pounds each.

The Merinos and the Saxonies, the latter descended from the former, yield only a light clip of wool, a small weight of mutton, and when brought directly from the continent, they are not hardy enough for this climate. Although our climate is quite different from that of Great Britain, it is a singular circumstance that domestic animals obtained from England thrive better in America than those brought from the continent of Europe.

There can be no doubt of the adaptation of Massachusetts to sheep husbandry. In some sections the business may not be profitable, but in others it certainly is. All the hilly and mountainous districts are adapted to sheep, and thus far they have thriven upon the barrens of Plymouth and Barnstable. It may be assumed that highlands are preferable to lowlands, dry pastures to wet meadows, and short, sweet pastures to the most luxurious vegetation. The downs of England, where the variety of sheep above mentioned is found, are dry, sandy districts on which sheep only can be supported. From the fact that the sheep will feed upon four hundred different plants, we may assume its fitness for any soil, however barren or unpromising for other purposes.

Expensive estates cannot be devoted to sheep, therefore this branch of husbandry must be limited to low-priced lands.

The cost of keeping a full-grown sheep, is, as far as I know, a matter of uncertainty. In 1856, a Mr. Horace Clark, of Wilbraham, estimated the cost of keeping ten sheep at fifteen dollars a year. This seems to me altogether too low. If, as is stated by English raisers, eight sheep are equal to one cow, the cost cannot be less than three dollars in any section of the State, and in others it would be five, or even eight at present prices of hay and grain. I feel quite sure, however, that ten or twelve sheep may be wintered upon the provender that would be given to one cow. Mr. Clark's account shows a net annual profit upon ten sheep of forty-one dollars. If the cost of keeping had been put at three dollars instead of one dollar and fifty cents, the net profit would have been twenty-five dollars, which is certainly better than ordinary farming, the gain being at the rate of fifteen per cent. upon the value of the animals. Mr. Beebe, of Wilbraham, returns a gross annual profit of more than six dollars a head for several years. If three dollars be deducted for keeping, the surplus is ample if the business were extensive.

Mr. Thomas J. Field, of Northfield, was engaged in sheep raising. He is very well known as a trustworthy and honorable man. Mr. Field made the following statement and estimate in 1853 and 1854.

Value of flock March 1, 1853:

100 ewes,	$400 00
220 ewes, old,	120 00
160 yearlings and two-year-olds,	400 00
1 buck,	80 00
	$1,000 00
Gained during the year,	1,026 55
	$2,026 55
Sold during the year:	
61 sheep, fat,	$186 00
50 ewes in October,	121 00
1,101 pounds wool,	605 55
	$912 55

On hand March 1, 1864:

134 ewes,	$536 00
38 fat sheep,	133 00
142 yearlings,	356 00
3 bucks,	100 00
	$2,037 55
Deduct cosset bought,	10 00
	$2,027 55

In this account, Mr. Field does not appear to have taken any notice of the cost of keeping three hundred sheep a year, and if we consider this to be three dollars each, the net profit will be $126.55, or at two dollars there would remain a profit of $426.55.

Mr. Soule, a merchant in Boston, but a farmer in Rhode Island, informs me that it is his practice to keep about thirty sheep. These he buys at Brighton, in October or November, crosses with an Oxfordshire Down, clips the wool in the spring, sells the lambs in early summer, and converts the old sheep into mutton in early winter, or about a year after his purchase. This course he finds very profitable. The lambs are early and sell in Providence at high prices, ranging from four to eight dollars, while the parent stock cost only a moderate sum each, the preceding autumn. The clip of wool and the mutton usually yield a sufficient sum to pay the cost of the sheep and the keeping of the flock, while the price of the lambs is carried to the credit side of the transaction.

The whole proceeding, it will be observed, combines the business of the merchant with that of the farmer. The examination I have been able to make, leads to the conclusion that sheep husbandry is as profitable, under favoring circumstances, as other branches of agriculture.

If the question of profit be settled, there remain but three difficulties. The introduction of sheep requires enterprise, knowledge, and good judgment. *One thing is certain, we cannot afford to raise poor sheep*, and good animals and good varieties are very expensive. If the business were to be undertaken, especially at the present high prices, there must be considerable outlay in the beginning; and this outlay might require the joint efforts of several persons. *If farmers raise stock of any kind, they ought to raise that which is good.* In this particular we are already too negligent and altogether behind some other sections of the country. To be sure, where stock raising is the leading business, more attention will be given to breeds and specimens. In the small town of Middlefield, containing less than seven hundred inhabitants, the farmers paid a thousand dollars in a single year for a single animal, each from the Devon and Shorthorn Durham breeds of cattle. But, I am sorry to add that that same year, the good people of that town, raised by taxation only five hundred dollars for the education of their children, and, under the district system, divided it among fourteen schools and twenty-eight teachers.

But they are already taking more interest in schools, and realizing great profit from the improved cattle. A gentleman in that town wrote me about three years since that he had just killed a cow of the Shorthorn Durham breed, that weighed nine hundred pounds, and had one hundred pounds of tallow. *I am well convinced that farmers of Massachusetts, waste much time and lose large amounts of money by neglecting to raise good stock.*

I hope, therefore, that sheep husbandry will not be attempted unless those who engage in it are prepared to introduce valuable animals, at such cost as may be necessary.

Another difficulty exists in the want of good fences. There is, however, no serious trouble in protecting the heavy varieties of sheep, whether Oxfordshire Downs, or Leicesters. A four-rail fence properly set, or a board fence, or a wall with a pole for a rider, is quite sufficient.

Dogs are the great enemy of successful sheep husbandry in New England, and as long as they are allowed to wander at large, it can never become a profitable and comfortable business.

Aside from and beyond the direct and immediate profit of sheep husbandry, the improvement of our worn-out acres devoted to pasturage, is a consideration not to be overlooked. It is very well known that sheep improve pastures, especially if they are so kept that they are driven to close feeding. They destroy all the common weeds, briars, and bushes.

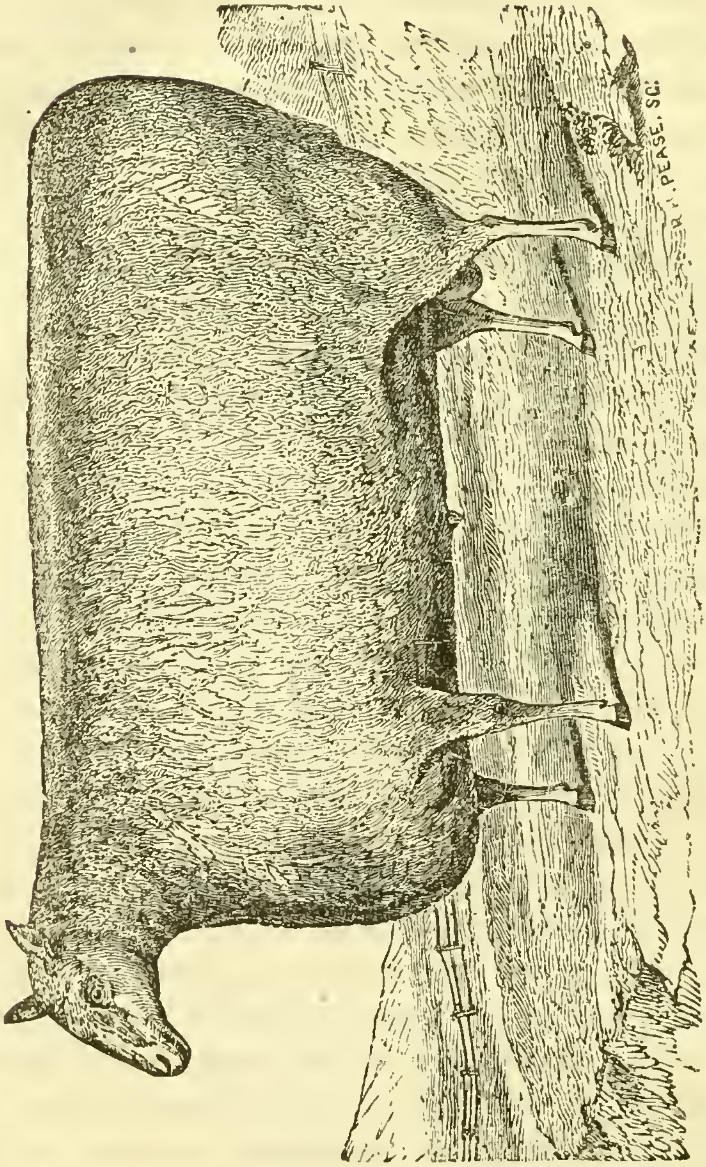
If, however, they are furnished with an abundance of white clover, and other succulent grasses, they do not care to taste many of the four hundred plants on which in extremity they will feed.

There are hundreds of acres of pasture-land that can be reclaimed in no other way, and it is probably true of half the breadth of pasture in the State, that by sheep feeding its productiveness may be increased five per cent. a year, for ten years. In that period a town would be able to keep as many cattle as at present, and twice as many sheep as cattle. Upon this theory it would be wise to engage in sheep husbandry, even though the direct profit should not exceed that of other branches of agriculture. My present impression is that Mr. Soule's plan is one which offers more advantages than any other to those residing in the vicinity of good markets. In England, flocks change hands often. One set of farmers rear sheep to the age of one or two years, and then sell to those who have superior facilities for fattening the animals.

It may be wise for farmers who own hill pastures that are exhausted, or plain lands of inferior quality, to consider whether the plan adopted by Mr. Soule may not be successfully copied, and thus their lands improved, and a profit obtained, as large at least, as that derived from other branches of farming.

In my visits to various parts of Massachusetts, and to other sections of the country, I have observed that the prosperous farmers are those who have one leading branch to which all their labors are directed, and the thriftless men are they who have no leading object, no branch of industry on which they rely. *There can be no real success in farming, unless those engaged in it follow it with ardor and in the spirit of progress.*

It is a reasonable hope that the teachings of the schools, the colleges, and especially of the agricultural college, together with family influences, will do something to render agriculture more attractive to young men, and that, in the meanwhile, the great body of the farmers will readily accept the contributions made by mechanics, by which the business of farming can be more economically pursued.



R. H. PEASE, SC.

New Leicester Buck. Bred and owned by S. & W. S. ALLEN, Vergennes, Vt.

ESSEX.

From the Report of the Committee.

It would seem needless, at the present price of meat and wool, for us to say anything to urge the farmers of Essex County to keep sheep. We are satisfied that all who have kept a flock as part of their stock are convinced that it is the best paying of their farming operations in dollars and cents; and the profit does not stop here. Look over our pastures through the length and breadth of the State—bushy, rocky, uneven and hilly, most of them unfit for cultivation—and it would seem, by the constant cropping they have sustained, that they have nearly come to the end of their capacity to bear grass. In proof of this we see the woods are taking possession of them in all places remote from villages and dense populations. In the older cleared portions, where there has been but a small quantity of foreign manure applied, that is, manure not made on the farm, it has become necessary to give milch cows ground bones, or they become poor and stiff, and, in some instances, have lost the use of their limbs beyond remedy.

Many of the owners of these pastures have not the fertilizers on hand, and are not able to procure them in sufficient quantities to make a permanent improvement on them. But we have the lands. What is the remedy? Nature, ever kind, ever faithful to herself, will restore them if we do not interfere, by a growth of wood; and we believe that sheep kept in these pastures will do the same thing. The first process is a long one, beyond the lives of one, perhaps of two generations. The second is shorter, and the length will depend much on the manner in which the flock is kept. We are quite sure lands can be so restored, for the best of reasons, that we have seen instances where it has been done. We think that the quickest and most permanent method would be to stock the pastures fully with sheep, and to feed the flock in addition with grain or oil meal. If the pasture is fully stocked we are sure it will be certain death to most bushes and briars which infest it.

The question whether coarse or fine wool sheep are best adapted to the county seems to be disputed, and it is probable ever will be, considering the diversity in our soil and the difference in management of different individuals. It is contended that the small Merino, with its compact frame, is best adapted to our sterile pastures, that it returns a larger amount of finer wool for weight of carcase, and that it can be kept at less expense per pound than can the larger breeds. On the other hand, those who claim that the larger varieties are most profitable, contend that they are most prolific, giving one hundred and fifty per cent. of lambs where the Merino will give but seventy-five—that they shear more wool, worth nearly as much per pound at the present time, and that the cost of keeping is but a trifle more for a coarse than for a fine wool sheep. But we will not go into a discussion of the merits of the different breeds. We hope that the farmers of Essex will try some kind as part of their stock, and will not only show us specimens of their flocks, but will also give us an account of their success, with details of their management, and their profit and loss, at the next show.

FRANCIS DODGE, *Chairman.*

POULTRY.

NORFOLK.

A Prize Essay on the Breeding and Management of Poultry.

BY E. A. SAMUELS.

It is now very generally admitted, both by experimenters and writers on the subject, that poultry husbandry, taking into account the amount of capital invested, and the labor required in its management, is one of the most profitable branches of farm industry. Constant experiment and careful observation, in various districts, have proved that at least one hundred per cent., usually one hundred and fifty, and, with judicious management, two hundred per cent. may be realized as clear profit.

Unfortunately, the importance of the subject has been but little appreciated among farmers generally; and, although the annual production and consumption of poultry in the United States "probably exceeds $15,000,000," it is but recently that a regular system of management has been adopted, and the poultry-yard allowed a respectable position with the cattle-house and sheepfold.

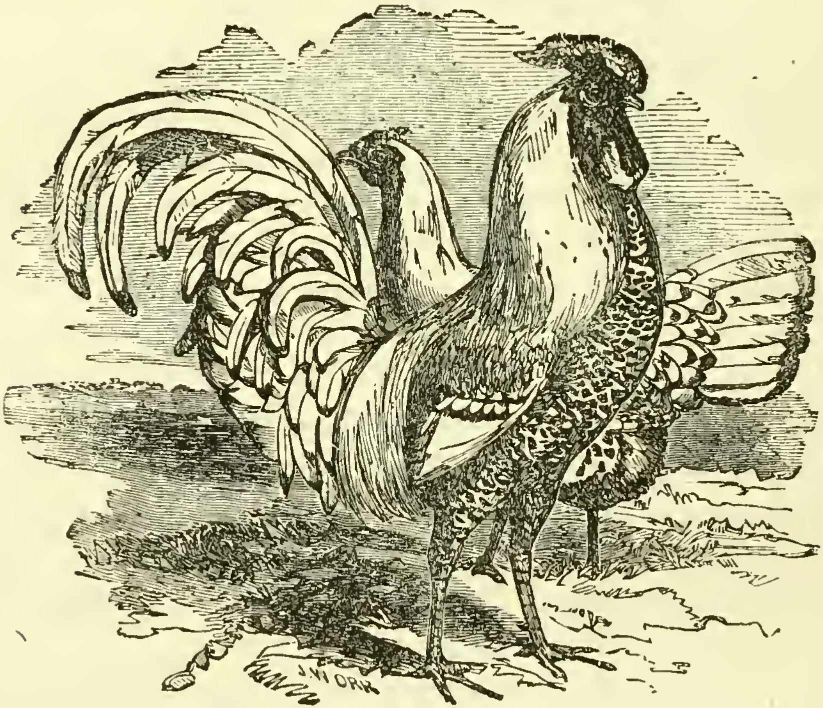
The question, from which the greatest profits accrue, the raising of poultry for market, or the sale of eggs, is still, I think, unsettled; both systems have their earnest advocates, and strong arguments have been advanced, together with results of many experiments; but I am inclined to think that a judicious union of the two branches can be made more profitable than a persistent adherence to either. Of course, circumstances in this as in other callings, control results; and there are many considerations to be taken into account before a decision can be arrived at; for instance, what is the character of the country where the fowls are to be kept; what are the facilities for transportation to market; what amount of attention can be bestowed upon the flock.

In an agricultural neighborhood, where food can be procured at producers' prices, (that is, if the poulterer does not raise his own food,) and where the fowls can have access to fields and pastures, at least twice a week; where railroad transportation is convenient of access, (and certainly no Massachusetts farmer can complain on this score,) and where constant attention and care can be rendered, the raising of poultry for market will probably be found the most profitable. But in districts less agricultural in character, where food for the flock must be transported, often from considerable distances, and where only a limited amount of attention can be bestowed, the production of eggs will, undoubtedly, be the most remunerative. Generally, however, as before remarked, the judicious combination of both systems will insure the greatest profit.

The labor required in poultry husbandry is not necessarily expensive, for inferior farm hands, such as boys or women, as in Great Britain, can be employed. Farmers, in the harvesting of strawberries, pease, and other products, requiring light labor, do not hesitate to employ every available hand, and often at quite remunerative pay. Why cannot constant employment be given in the poultry yard to some of these lighter hands on the farm, at times when they are not needed in the field, where, if a judicious system is adopted, their labor may be very remunerative?

Poultry husbandry is undoubtedly profitable under almost all circumstances; the object of the farmer is, therefore, to make it remunerative in the highest degree. He must obtain a flock of the best fowls, whether for breeding or laying, or both, and adopt a system involving the least expense, both of labor and money.

At the time when the "hen fever" raged so terribly in this country, a few years since, a great variety of breeds was introduced, some of which were undoubtedly valuable, but the most of them nearly worthless for general use. Undoubtedly, the mixtures of these breeds have been of great benefit to the common stock of the country; but we are in the days of Jerseys, Ayrshires, and Devons, and nothing but pure foreign breeds will do; for in cattle husbandry, the result of careful breeding and culture is that the Ayrshire and Jersey are best for the dairy, and the Devon and Durham for beef; so in poultry husbandry, the most careful and accurate observation and experiment prove that the Black Spanish and Hamburg fowls are the best breeds for laying, and the Dorking, and, perhaps, the game fowls for breeding and the market. Of course there are many other good breeds; for instance, the Polish Topknots, Spangled, Polish, Bolton Gray, Leghorn, Creeper, and Dominique; but there are objections to all these breeds, in some cases serious ones, far surpassing any peculiar to the others I have named. The different varieties of the Malay fowl—such as the Shanghai,



Bolton Grays. Bred by S. & W. S. Allen, Vergennes, Vt.

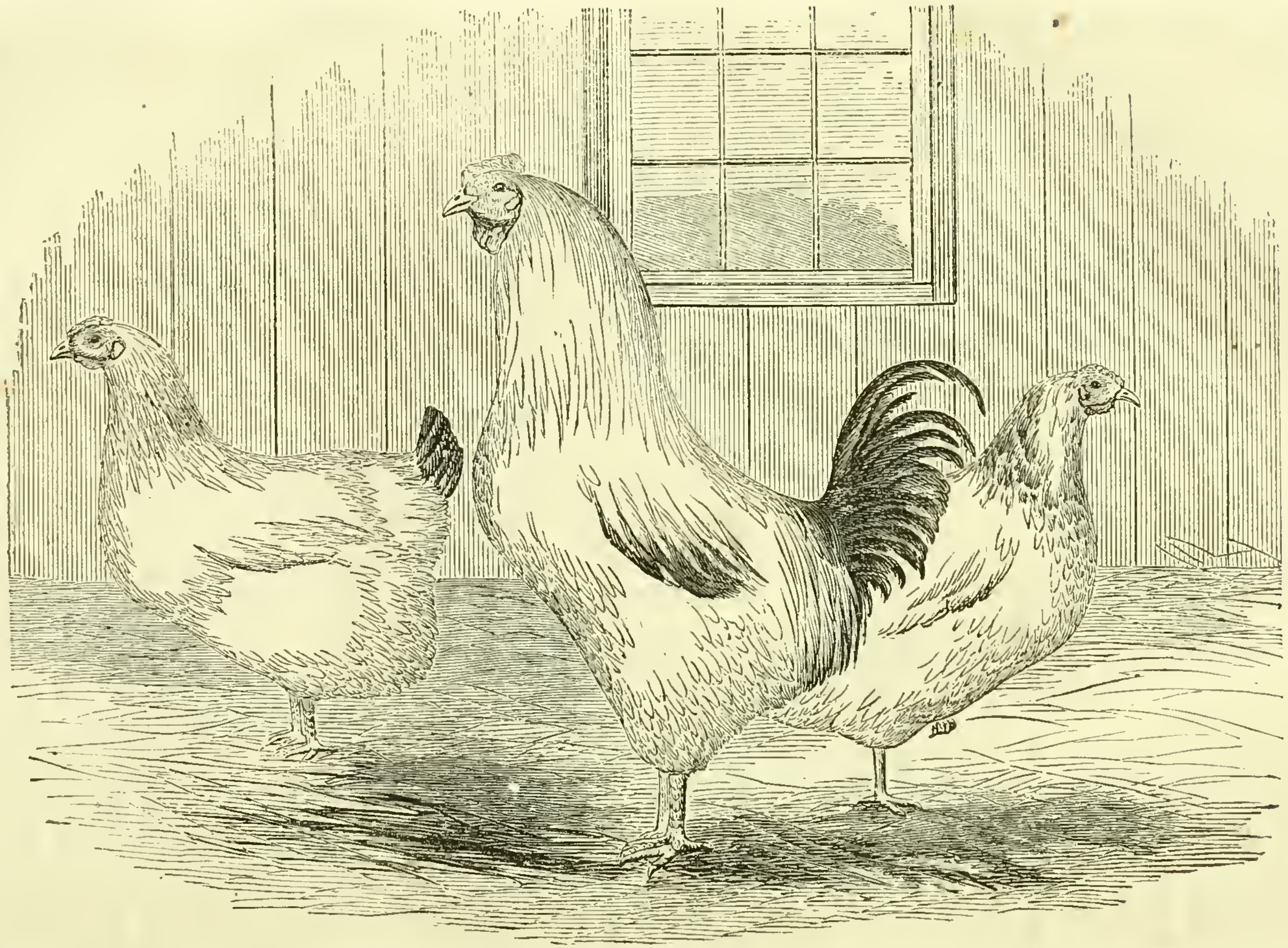
Cochin China, Chittagong, and Brahma Pootra, are almost worthless, except as a cross with the common barnyard fowl; for they are generally poor layers, clumsy, although *persistent and indomitable sitters*, and their flesh is coarse and ill-flavored.

The farmer has therefore but four breeds to select from, if he wishes to arrive at the maximum degree of profit. These breeds have well-marked and infallible characteristics, all different from each other to a certain extent, but uniting in the most desirable qualities.

The Black Spanish fowl is certainly the most desirable breed we have, where a good layer and table fowl is desired. The full-blooded bird is of a jet black plumage, with reflections of greenish blue, and both sexes have very large, high-colored wattles and combs, and *white faces*. The males are courageous, but attentive and kind to the females, who are most excellent layers, but poor sitters, and inconstant nurses. The flesh of these fowls is extremely delicate, white, and juicy. The eggs are of good size and excellent flavor. Together with these desirable qualities, this breed is easily reared and fed, (the birds being but small eaters,) and they reach maturity at an early period. Care must be taken in severely cold weather to protect them, as their large wattles and combs are easily frozen.

The Hamburg fowl is another excellent laying breed, often being called the "Everlasting Layers." There are five varieties:—the Black, Golden Spangled, Golden Pencilled, Silver Spangled, and Silver Pencilled. These are all desirable breeds for laying, but the eggs are rather small, and the birds not so large for the table as the Black Spanish, although of equally good flesh. The males are kind and attentive, and the females seldom desire to sit. This is the breed that Martin, in his Book on Poultry, wrote of, as follows:—"The hen betrays no disposition to incubate, but continues to lay eggs, as if for no other purpose than to repay her keeper." This breed is not very hardy, but, in a warm house, will lay throughout the winter.

The Dorking fowl stands, unquestionably, at the head, where a breed for poultry is desired. Both sexes have usually a pure white plumage, sometimes gray or mottled; their hind toes are doubled. The males are peaceable and attentive to the females. The hens are good layers, and excellent sitters and constant mothers. These fowls are very heavy. Their flesh is delicate



Brahma Pootras. Bred and owned by H. G. White, of South Framingham, Mass.

and juicy, yielding an abundance of what is called "white meat," in consequence of their great depth of breast. The eggs are large, and of delicious flavor. Perhaps, for general purposes, this breed is to be preferred, as in it are united the most desirable qualities.

The game fowl is valuable as a stock fowl. The only great objection to it is its extreme pugnacity, on account of which the young are with difficulty reared, "sometimes a large part of the brood being killed or blinded" before they are half grown. The females are good layers and mothers; and their eggs, though small, are deliciously flavored. The flesh of this breed is extremely delicate and fine grained, and in great repute. A cross of the breed with the Dorking is valuable for general purposes.

Although poultry husbandry properly includes the management and breeding of several species of domesticated waterfowl, together with the turkey, Guinea fowl and other species more nearly allied to those already considered, I do not propose, in the present paper to treat of them or their merits, but shall confine myself to those above mentioned.

Accurate observation and experiment have proved that the maximum number of fowls in one flock should not exceed fifty. If more are kept, they should be divided into several flocks. The first necessary step then before selecting the poultry, is the preparation of houses and yards, each furnishing suitable accommodations for fifty fowls. In the preparation of these houses, economy, together with the best facilities for giving the the fowls greatest care with the least amount of labor, are objects always to be kept in view by the farmer. In selecting a site for a poultry house, a porous, sandy soil is the most suitable, and a south-east exposure should be chosen. If a brook or spring of pure water is accessible, and can be admitted into the yards, it will add not a little to the comfort and health of the fowls. The dimensions of the house need not exceed eighteen feet by ten, and the height eight feet at the back or north side of the house, and six feet at the south. This plan is most desirable, because the roof will be simple and sloping to the south, and there will be no waste of material or space. The material should be well-seasoned stock; the frame may be made of three-inch joist and covered with one-inch boards; the roof and back should be shingled; the rest of the joints should be battened. The sills of the building may be sunk two or three inches in the ground, but not more. I think that the experience of a majority of poulterers has been that a wall foundation for the poultry house, *unless it is thoroughly cemented*, is very undesirable, both on account of its harboring rats, weasels, and other vermin, and its being less comfortable in winter. The floor should never be made of boards, but of earth, which can be renewed, more or less frequently, at will, and the droppings of the fowls, rendering it the best of manure. Some recommend that a pile of saw-dust be kept near at hand, and a few shovelfuls thrown into the house daily. I think that loam and sods of green sward are better, because they not only absorb and retain the ammonia, but furnish amusement and acceptable picking for the fowls. There should be several large windows in the front of the building, which may be protected by laths. The entrance should be at one end. The interior should be divided into two apartments, one ten, the other eight feet in length, which may be separated by a partition of laths, with a door for passage through. These apartments are designed, the larger for roosting, and the other for laying places. The roosts are most conveniently placed in the form of a ladder, inclined to an angle of about forty-five degrees; the lowest should not be more than three feet from the ground, for valuable fowls are often injured, sometimes fatally, by flying up and down from high roosts.

There should be two tiers of nests in the laying apartment, one on each side of the passage to the roosting apartment; and as secrecy is the great point the hens strive for in laying, the following is a very convenient plan for adjusting the nests. For entrances between the two apartments, have two small doors sufficiently large for the passage of the fowls; one at each end of the lath partition. The nests should be placed in rows, above each other, and accessible by hen ladders. They should be boarded up on the side next the main passage-way of the building, and separated from each other by board partitions. Small baskets are most suitable for nests, being easily removed and cleaned, in case lice or other vermin have taken up their quarters in them to the annoyance of the fowls. These baskets should have a liberal allowance of clean, *short* straw, or moss, and in each a "nest egg" of wood, turned into the shape of an egg, and painted white. The boards, behind each row of nests, should be hung on hinges, for greater convenience in changing or preparing the nests, and for the removal of the eggs, which should *always be soon after the fowls have gone to roost*, in the evening. The poultry house and the fence (which should be about twelve feet high, made of laths,) around the yard being built, the next step is the choice of fowls. The female should not be less than one year, nor more than three years old. She should be nervous and noisy; and, if intended for a breeder, of large body and wide wings. The male should be about two years old, of perfect health, full bodied, broad chested, nervous and courageous, yet kind and attentive to the females. He is too old if more than three years of age. If the flock is intended for breeding purposes, at least one male should be provided for every ten females; but, if eggs are desired more than chickens, perhaps two cocks for fifty hens will be enough; indeed, some poulterers affirm that they get more eggs from hens where no cock is kept than otherwise. Be this as it may, few cocks should be kept with laying hens, as their presence rather induces or stimulates their sitting propensities.

The poultry-house prepared and the flock selected, the farmer should see that they have proper care and food; that unhealthy fowls are restored or removed; that those hens which incline to sit are provided with eggs; and that the chickens when hatched are taken proper care of. Fowls in confinement require an abundance of pure water, ashes, to dust themselves in, and nourishing food. Of grain, equal parts each, of Indian corn and oats is very acceptable; at least three times a week, scraps of meat should be thrown in to them, and a supply of crushed oyster shells or clam shells should be accessible at all times. Green sods also thrown frequently into the fowl-yard will be of great advantage. These few attentions are all that are necessary with laying hens.

With sitting fowls, care should be taken that they are really in sitting heat. They often manifest a desire to sit, remain on the nest two or three days, and then abandon it altogether. This can be avoided by allowing them to sit several days, to test their constancy; if they prove really in heat, select *fresh laid* eggs of a sufficient number to be *well covered*—an odd number is best, because the eggs will pack most regularly. In selecting these eggs, some persons believe that when the long, slim ones are taken, the chickens will be invariably males, and the thick, nearly round ones, females. This is a very uncertain plan to adopt in the choice of eggs, and ought never to be relied upon. The surest method seems to be, to select those eggs, if pullets are wanted, which when they are held between the eye and a lamp, discover the cavity at the great end of each egg to be at one side of the centre of it. If it is at the centre, the chick will be a male.

The sitting hen should have her nest where she cannot be troubled by other fowls. Give her a retired, quiet place, and she will seldom want to leave her nest; but if she is in the bustle of the poultry-house, she will be nervous and restless, and, oftentimes, will abandon her nest. There should be convenient to her sitting place a box or pile of ashes, where she can dust and wash herself, plenty of food, and pure water. These are the only attentions she requires. The period of incubation is twenty-one days; during this time the hen should be left to her own inclinations, and the eggs should not be touched or moved; she carefully turns them that they may receive a uniform warmth, and any interference with her management only irritates her, sometimes causing her to break the eggs, or leave them entirely. At the end of the twenty-first day, all the chickens should be hatched; some, however, in consequence of great thickness and toughness of the shell, are unable to break it; these may be assisted by carefully, with the point of a penknife, chipping away the shell where the little punctures are made by the chick. Great care, however, is necessary in doing this; and, as a general thing, it should be avoided. The chickens require no food for twenty-four hours after being hatched. They may then be fed on a dough made of Indian meal and water; this should not be too thin, as it is liable in that state to induce diarrhœa. If the weather is pleasant, the chickens may be put out in coops the second day after hatching. These coops are most conveniently made in the following manner: take pieces of boards four feet in length, and make a platform three feet in width; to the two sides of this platform nail other pieces of boards, which will meet together as a roof, over the middle of the bottom; at the ends nail laths, sufficiently wide apart to permit the chickens to pass through comfortably. This gives a dry, comfortable house, which, with care, may be made to last a number of years. These coops should not be placed very near each other, as the chickens are apt to wander into other houses than their own, when the hen will often injure them seriously for the intrusion. To place a number of these coops of chickens in the kitchen garden is one of the best methods of reducing those pests, the striped cucumber beetle, cut worm, and potato beetle.

Before closing this paper, it is but proper that some mention should be made of the diseases of poultry. The most common are the pip, roup, diarrhœa, and gapes. The pip is mostly confined to young fowls. The symptoms are "a thickening of the membrane of the tongue, especially towards the tip;" this soon becomes sufficiently great to obstruct the breathing of the fowl so far as to cause gasping, and the beak is held open to assist breathing; the chicken then soon pines away in solitude. This disease is caused by feeding upon hot food, and drinking impure water. Generally, if the end of the tongue is cut off, and a supply of pure water is kept by the fowl, a cure will be effected; in obstinate cases the bird had better be killed. The symptoms of the roup are similar to the glanders in horses; "constant gaping, dimness of sight, lividity of the eye-lids, and the total loss of sight, a discharge from the nostrils, that gradually becomes purulent and fetid." For treatment, place the fowl in a warm apartment and bathe the mouth, eyes and nostrils with a weak solution of chloride of lime and acetate of lead. The diarrhœa is caused by dampness and improper food. In the treatment of this disease, the food should be placed in a warm room, and some chalk and cayenne pepper be given in its food. The treatment for the gapes is similar to that for the pip, and the symptoms are nearly the same; it is caused by the presence of numerous parasitic worms in the windpipe. These may be removed with a stiff feather.

MIDDLESEX SOUTH.

Statement of I. K. Felch.

In presenting my blood stock of Golden Pencilled Hamburgs for premium, I would respectfully submit the following statement, and in addition would say, I have sold eight dozen of their eggs for eight dollars, which will make the profits of the fall as follows:

472 eggs at 33⅓ cts. per doz., the average store price,	$13 11
Dr. for keeping, ...	3 74
Net profit, as common fund, ...	$9 35
Difference of eggs sold for $1 per doz., . . .	4 66
	$14 01

The hen in pen No. 2, we believe, has laid 150 eggs in the six months. In pen No. 3, I present for premium a pair of pure breed from my stock, which are the property of Charles Landburn, the same being entered for him. This pair of fowls has been enclosed in a coop twelve feet long and six feet wide, all of the time. The hen commenced to lay, on January 31st, and laid from that time to the 7th day of July, 119 eggs. The remainder of the six months she did not lay, but as you see, she laid her whole number in five months and eight days. She commenced to lay again, August 8th. Her keeping has been varied, but she has had the best of care, and I don't hesitate to say that 200 eggs a year can be had from each hen of this breed, if they have their health through the year.

In my opinion, the above fowls are the best breed for eggs that has yet been presented to the public, and in giving the merits of the breed to the public, I submit the following statement of my four hens and a cock for six months: from March 10th to September 10th, 1864. The above fowls have been for most of the time enclosed in a yard, three rods long and one rod wide, and their food has been nothing but corn, with fresh water and oyster shells, at an expense of three dollars and seventy-five cents for the five fowls for the six months. The four hens have laid in the six months, 472 eggs, and one of the hens has been sick ten weeks of the time, being an average of 118 eggs to each hen; but to give each hen her just merits, we should consider the hen that has been sick to lay about one-half as many eggs as each of the others, as she would not naturally lay as frequently, when laying, as the others. Allowing her to lay 60 eggs, would leave 412 eggs to be laid by the three other hens—being 137 to each healthy hen. One of the three hens has laid, in our judgment, 150 eggs within the six months. From observation, we know that she has laid constantly, and more eggs than either of the others, therefore, I feel confident of the above. Their flesh is of a lighter shade than the Black Spanish, but as to its juiciness and flavor, I cannot say; for I imported them in the spring of 1863 and have not as yet killed one, so I cannot judge as yet of their merits for poultry. They seldom sit until three years old, my hens being now two years old, have not as yet shown any disposition to brood. Their color is of dark green and black ground, with feathers pencilled with golden reddish color, with rose combs and long sickle feathers, resembling the English Red Cap fowl.

In submitting my blood stock of Brahma fowls for your consideration, I can only call your attention to my collection, as I have not this year taken the pains to ascertain the amount of eggs or chickens they have produced. I exhibit the original cock (stuffed) with three trio of progeny, being son, father, grandfather, and great-grandfather, which by comparison you can tell if the stock holds its own. For reports of the merits of the breeds you can consult previous reports of the society. I would call your attention to a brood of chickens exhibited by Isaac Felch, twelve weeks old to-day, (September 20th,) which have been allowed to get most of their living themselves, being put out in a lot away from the house and fed as inclination or circumstances dictated. In my opinion, with Brahma and Chittagong fowls for poultry, and the Golden Pencilled Hamburg and the Leghorn fowls for eggs, no man need to look further for fowls which will be both profitable and a pleasure to keep.

Statement of Samuel B. Bird.

The fowls which I offer for premium are a mixture of the White Leghorn and Common Native fowl, with the exception of five which are pure White Leghorns. I think a cross of the White Leghorn with our Native, the most profitable fowl a farmer can keep. They are good layers, good size; will weigh at five months old, six pounds a pair, are hardy and easily kept. Since January 1st, I have kept, on an average, fifteen fowls, all of them one year old last June. They have been allowed to run at large on the farm, and have been fed with corn, barley, oats, and meat; the chickens are fed on coarse meal, moistened, until five or six weeks old; then on corn and barley. I have set three hens on forty-one eggs, and raised thirty-three chickens; they were hatched the first of June and are now three and a half months old. I have kept an exact account of the eggs sold and used in family, since January 1st, and also the cost of keeping. I reckon the eggs used the same as those sold at the same time. The sales have been of eggs:

171 dozen, amounting to	$45 26	
33 chickens, ...	9 90	
Whole income, ...	———	$55 16

The cost of keeping for the same has been:

4 bushels corn at $1.50, ...	$6 00	
4 bushels barley at $1.50, ...	6 00	
Oats, meal, meat, &c., ...	4 50	
Whole cost, ...	———	$16 50

Leaving a balance of $38.66 in my favor, or about $2.58 for each fowl.

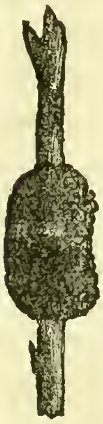
FRUITS.

MIDDLESEX.

From the Report of the Committee on Class I.

The increased value of land in the immediate vicinity of Boston, has caused and is yearly causing much of the orcharding to be cut down and give place for more profitable crops. This fact, however, will not lessen the value of those orchards more distant, and on land of less value.

Apples.—That the apple crop will continue in most parts of the county to be profitable, there can be little doubt. Those farmers who follow the market have found the early and fall fruits to be the best paying, such as the Red Astrachan, Porter, Gravenstein, William, and the like. These cannot, however, be recommended to those who do not frequent the market; as they do not ripen their fruits simultaneously, the crop cannot be gathered in large quantities.



The common caterpillar was much more destructive the last season than for many years. On small trees, and perhaps on large trees, the best method to get rid of them is, to take the nests of eggs, as shown in the annexed cut, off either late in the fall or winter. This can be done after the fall of the leaves; by looking carefully over the trees nearly all can be removed, and in much less time and much more surely than after the worms have hatched out. Besides, it can be done in a season of more leisure.

J. Cummings, Jr., *for the Committee.*

From the Report of the Committee in Class II.

Contrary to the expectations of many, the show of apples at our last annual fair proved, upon ocular demonstration, quite creditable to the society. Long continued east wind, while the trees were in blossom, caused much blight in some varieties at least.

Later in the season, and when the remaining specimens which had escaped the blight were advancing in growth, we were visited by a severe and pinching drought, and a consequent, in part at least, visitation and almost wholesale ravage of insects. From the period when the parents of the core-worms emerged from their cells, or cocoons, until their progeny had all found their way into the fruits on which eggs had been previously deposited, no rain fell to interfere with the mothers' operations by washing off eggs, or by drenching and beating to the ground the parents of the troublesome pest. The weather being quite warm at the time, the work of destruction was carried on with vigor, so that we had looked forward with the expectation of finding a large percentage of our apples wormy, and were not disappointed. In many instances, where a medium or large crop was expected early in the season, the harvest realized was rendered light and meagre by want of moisture in the soil to sustain it; as a consequence, much fruit fell from the trees which was not punctured by worms.

Notwithstanding the drawbacks upon the apple crop which have been named, the contributors to the show were out in as large numbers as ever before, except, perhaps, in one or two instances, and the specimens have not often been excelled. I think the lot of twenty varieties, presented by E. H. Warren, of Chelmsford, was fully equal to any previous exhibition made by him within my recollection. The same is true of an Acton gentleman's, whose name has slipped my mind. Some of the single dishes did not contain so large and fine specimens as has been witnessed of the same varieties before. For instance, the Williams and Porters were inferior to former displays; while the Foundling, Lyscom, Hubbardston and others were remarkably large and fine. From observations in my own orchard, prior to the day of exhibition at Concord, I had arrived at this conclusion, viz.: that some varieties of apples are more affected by drought than others.

The past season, while the Lyscom, Hubbardston and others, grew large, in no respect to any perceptible degree pinched by a lack of moisture,—the same being true of the Russet Sweet, the trees of which variety were quite full of large and fair specimens,—the Williams, Porter, and Roxbury Russet were far below, in point of size, what we have before witnessed. There are exceptional cases no doubt. That apples and pears or grapes and apples should be affected unlike, or in different degrees by drought, does not surprise me, while the difference in the same family does puzzle me a little. I trust there are persons who may be able to explain the phenomenon, but I am not.

Another, and it may be, a more important question arises in the minds of fruit cultivators, which is this: how shall we, or how can we prevent the ravages of the core-worm and other pests which annoy us? In my experience I have found it more easy to ask questions than to answer them. The practice of picking up apples and other fruits which fall prematurely from the trees, and feeding the same to swine or other animals, or treating in any way which shall destroy the worms therein contained has been, I think, wisely recommended as a means of diminishing the number; yet, where the experiment has been tried, the results have not proved satisfactory to a degree that has stimulated the experimenters to renewed and persistent trials. Whole neighborhoods should take hold of the matter right earnestly, in order to arrive at favorable results.

Among the insect tribe, many are known to be night-flyers, bent on mischief. Moths will pitch pell-mell into a light, when presented to them in the blackness of night. The parent of the core-worm being a little grizzly moth, I move, therefore, that orchardists, next June or early in July, immediately after the above named night-flyers make their appearance, do make, or cause to be made, bonfires giving much light but little heat, at different points in their several orchards, on some dark, lowery evenings, keeping an eye to the same in order to ascertain results, and report the same at a subsequent time. I have tried the plan indicated, on a small scale, and seen the " varmints " go in.

Asa Clement, *for the Committee.*

MIDDLESEX SOUTH.

From the Report of the Committee.

Pears.—The cultivation of the pear, until recently, was confined mainly to those who did not cultivate it with any expectation of receiving a profitable return. Farmers who have covered many acres with apple-trees, have been satisfied with having one or two pear-trees on the farm, and have not even taken proper care of those, and if they did not bear good fruit have said there was no profit in raising pears. It has been thought that pear-trees would only grow and bear well near the sea-coast, but within a few years it has been shown that while they may do somewhat better near the sea than they do in the interior, they will do well anywhere in the State, if set in good soil and taken care of, and they are nearly as hardy as apple-trees, and from the greater number of trees which can be set upon an acre of land, and from the greater price of fruit, that it is certainly as profitable for farmers to raise pears as apples.

The dwarf has become a great favorite, and when set in a deep rich soil, it is sure to produce a good crop. There are some varieties of the pear which do much better and produce larger fruit upon the dwarf than upon standard trees. Those persons who have only a small garden can raise their own pears and have a variety by setting out dwarf trees.

Standard trees will grow upon more gravelly soil than dwarf, but, of course, will do much better upon good soil. The distance at which the trees should be set, is variously estimated. Ten by ten feet seems to be a good distance to set dwarf trees, which would give about four hundred and thirty trees to an acre. An orchard of five years' growth, ought, at least, to produce a peck of pears to a tree, and at ten years a half bushel to a tree, which, marketed at a fair rate, would yield a much greater profit than an acre set out with apple-trees, or planted with vegetables, and the expense of cultivation and marketing would be no greater. Standard trees should be set out, at least, fifteen by fifteen feet, and while it takes more time for them to grow to a bearing condition, when they do bear, the quantity of fruit obtained is greater than from dwarf trees.

If a farmer desires to set out a pear orchard, a good way to do is to set standard trees twenty by twenty feet, and then set a dwarf tree between each; the dwarfs will produce fruit almost immediately, and by the time the standard trees get to bearing, the dwarf trees will have died. Good quality of pears is of very great importance, which can be obtained by good variety and cultivation; the trees should be set in good soil, and the soil should be enriched every year; the trees should be well trimmed, the ends of the branches should be cut back every year, and the trees should not be overloaded with fruit; this is the most important of all, as nothing so much injures the flavor of the pear as overbearing. Instead of propping up the tree and tying up the branches to stakes, thin out the fruit until the tree holds up its own branches, and the fruit that remains will be much larger, better flavored, and will bring a greater price, and the trees will not be injured.

Complaint is often made that a pear-tree, after having borne very full a few times, ceases to bear, and no doubt the reason was that it was overloaded with fruit, and the tree was injured. To obtain good crops of pears, enrich the soil, cut back the branches every year, and thin out the fruit. The show of pears at our exhibition this year was excellent, and it shows that the farmers and others of our society, are giving attention to the subject of pear culture. Your committee recommend that more premiums should be offered in this department, as the committee found the sum of money at their disposal too small to recognize the claims of many exhibitors whose excellent specimens were really entitled to notice. Your committee would also recommend that contributors of pears at our shows, who obtain premiums, should be required to make a written statement of their manner of cultivation. This will increase the interest in this department of our exhibitions.

Peaches.—There were several varieties of peaches on exhibition this year, and your committee suggest that an effort be made to raise peaches, as we believe that the time is coming again when peaches will be raised in this State, and will be as healthy and profitable as formerly, as there are indications that the disease which has been so fatal to the trees has ceased to affect them, and if so, this fruit should receive the same degree of attention as in former years.

Grapes.—The exhibition of grapes was very good, perhaps better than at any former show, but it was not so large, and there were not so many exhibitors as there should have been. Farmers are giving more attention to grape culture than formerly, and there is no reason why every one who owns land should not raise grapes, for the hardy varieties of native grapes, the Concord, Delaware and Hartford Prolific, will grow upon any land fit for cultivation, and the Concord, with very little care, will produce a good crop of fruit every year. Among the grapes exhibited was the St. Catherine, a native seedling, raised by Mr. James W. Clark, of Framingham, and which bids fair to be a great favorite. Your committee would recommend that the exhibitors of grapes who obtain premiums shall be required to make a written statement of their manner of cultivation, in order to furnish information to others as to the best method to pursue to obtain the largest yield.

George L. Sawin, *for the Committee.*

NORFOLK.

A Prize Essay on Open Air Grape Culture.

BY WILLIAM E. RICE, M. D.

There is no fruit which will so richly repay the care and expense of its cultivation as the grape. By a judicious selection of varieties, it can be raised with profit in all parts of this State. By care to supply it with a favorable soil and exposure, and a moderate expense for suitable manures, it will yield a large crop of delicious and noble fruit. If, on account of distance from market, or other reasons, it does not find a ready sale, it can be made into wine, with but little more care than is required to make good cider. In this State, there are thousands of gravelly hill-sides inclining to the south south-west and west, which are now given up to shrubs and dwarf trees; they might be reclaimed and made to yield an income of from $300 to $1,200 per acre, every year. Good, ripe grapes can be sold in Boston, in large quantities, at from eight to fifteen cents per pound.

A cultivator of the vine, who has had large experience, told me, that with land worth fifty dollars per acre, it cost him five cents per pound (all expenses included) to raise Concord grapes. This was in the vicinity of Lowell. In three years from the time of planting, the vines commence to yield; if spur pruned, at that age, they will average four or five pounds to the vine. In the fourth year they will ripen ten or twelve pounds; and after that, with good treatment, from fifteen to twenty pounds every year, for at least from thirty to fifty years.

In Europe there are many vineyards that have been in cultivation for more than a century. The fruit of the vine is considered so healthy, that, in many parts of Europe, "grape cures" are established, where the sick are treated with a regulated diet, consisting mainly of ripe and juicy grapes, and in many cases we are told, with the best results. The man who stands in a European vineyard looks upon the result of twenty centuries of culture and improvement; for the original stock of the European wine grape (Vitis Vinifera) was a small, hard, and sour grape, brought from Syria.

In the botanical garden of the city of Dijon, in France, there are six hundred varieties of grape-vine. It is unfortunate for the present generation, that the highly improved and saccharine grapes of Europe cannot be naturalized in this country and grown in the open air. All experiments in this direction, have failed, unless protection has been given either by means of glass or high walls. The foliage is thin and tender, and cannot resist the rapid and extreme changes of temperature incident to this climate. The vine becomes sickly, and at once falls a prey to mildew. We must follow the example of Europe, and grow our own vines from strong and hardy stocks to be found in our woods. In them are the parents of a long line of noble descendants destined to ornament our hill-sides with purple and golden clusters, and to rival the luscious sweetness and rich perfume of European grapes. The intelligent skill of man has produced from bitter, sour, and worthless originals, all the noble and improved varieties of fruit which we have through *seedlings*. The same law has been, and must be, applied to the grape. Some thirty years ago, the only grapes generally known and sold from our nurseries, were the Catawba and Isabella. These are good where they will ripen thoroughly, which they rarely do in this State, our season not being long enough to ripen either wood or fruit. The Isabella originated in the South, and was introduced by Mrs. Isabella Gibbs. The Catawba was introduced by Major John Adlum, of Georgetown, D. C., and was adopted, and used in vineyard culture, by Nicholas Longworth, Esq., of Cincinnati, Ohio. Next came the Diana; a seedling of the Catawba, raised by Mrs. Diana Crehore, of Milton, Mass. This grape ripens a week earlier than the above-named varieties. Then came the Delaware, said to have originated in New Jersey, and introduced by A. Thompson, of Ohio. But to the intelligence and enterprise of a citizen of our own State we are indebted for the most valuable hardy grape for general culture yet introduced. I refer to the Concord grape, produced by the Hon. E. W. Bull, of Concord, Mass. Not only has the Concord been a direct benefit to us, but its success has stimulated others to work in the same direction, and new and improved varieties are rapidly succeeding each other. We have positive evidence that all parts of this country are adapted to the cultivation of the vine, in the numerous varieties of the wild grape, which overrun the States, from Maine to Florida. I think it may be safely assumed, that we shall succeed in obtaining varieties best adapted to each part of the Union, by improving upon the wild type of adjoining woods; *i. e.*, by planting seeds of the earliest, sweetest and best wild grape, in highly enriched and mellow soil. When the vines fruit, select the seeds of those which have improved most, and plant them; and so on, to any extent. In this way was the Concord produced in two generations from the wild Vitis Labrusca of the woods. Seedlings have since been produced from the Concord superior to the parent. Soil and situation modify all young seedlings, and great variations in color, flavor, and period of ripening, are produced. This is an extension of the theory which Van Mons applied to the pear. Mr. Bull advises us not to go back to the wild type, but to plant the seed of the best varieties now in cultivation. This will save time, though the seedlings frequently sport and return to the rankest of wild forms.

Soil, Situation, and Aspect.—The best soil for the grape is one that is light, warm, and moderately rich, also sufficiently porous to let air, heat, and water pass freely through it. Rich soils, loaded with manure, encourage the growth of wood at the expense of fruit. In this State, the best soil for the vine is sandy loam, from ten to fifteen inches deep, with an open or well-drained subsoil. The best soils are those which are composed of crumbling limestone, granite, or volcanic rocks. Some of the finest vineyards in Europe are planted in soil composed mostly of carbonate and sulphate of lime, (chalk and gypsum.) But the most successful vineyards, both in Europe and California, are planted in a red, sandy clay, and in such soils vineyards are commonly planted. Most writers on the grape advise deep trenching, and the preparation of a soil from eighteen inches to three feet in depth. There is no doubt that this tends to prolong the vigor and life of the vine in a warm climate, but as the ripening of the wood and fruit depend a great deal upon the heat applied to the roots, they should be kept near the surface in all northern countries, where the season is too short to heat the earth to the depth of two or three feet. To prevent damage from drouth, the ground may be mulched, with any cheap material, in hot and dry summers. Even the most unpromising, gravelly or sandy land can, by a judicious mixture of either muck, pond mud, or leaf mould, with clay and manure, be rendered extremely fertile. These materials may be carted on to the land in the mild days of winter, and worked in the next spring. In Europe they sow lupines, (a kind of bean,) or clover, and plough them in when in flower; and the next year, they plant the vines. Grapes will grow in almost any kind of soil, from nearly pure clay to nearly pure sand; but a mixture of the two with a little vegetable mould will be the most successful. Put clay upon sandy land, and sand upon clayey land. The vine cannot bear stagnant water about the roots, but loves to ramble in dry, open soil. If the soil is not dry, build stone drains. Level ground will answer; but the sweetest grapes and finest wines are always grown on the hill-sides. The heat that is absorbed and radiated from the ground does more to ripen grapes than the direct rays of the sun; and, on the hill-sides, the fruit has the advantage of this heat. The best exposure is south south-west, and west and south-east, in the order given. Least favorable, east north-east and north. The vine should not be shaded directly, either by trees or buildings; though it is a great advantage to have protection against north and north-east winds. In a small vineyard, this may be given by a ten-foot fence; in a large one, by a double belt of evergreen trees, planted in a semi-circle. Whatever soil is used, it should be well ploughed to the depth of one foot before planting the vines.

Manures.—The requirements of the vine are few and simple. Stimulating manures, applied to the vines, produce a rampant growth of leaves and wood, but no fruit. It is the same with the strawberry. Use, in moderate quantities only, mineral manures, and old, well-rotted compost. The best compost is made by mixing and heaping up grass-sods, fresh manure, muck or leaves, with a little ashes and gypsum, adding bones, when they are to be had. Turn the heap over occasionally, and when it is reduced to a uniform rich mould, it is in a fit state to nourish the vine. Cow manure will improve a sandy soil, and horse manure a strong clay soil. In France and Germany, manure mixed with fresh earth is annually carried on the backs of laborers and placed around the vines; the old soil having been previously removed to the depth of six inches. They also dig in the prunings of the vine,—a rational and most excellent practice. Their soil has been exhausted by centuries of the same cultivation, while ours is virgin to the vine, and does not require such treatment. Mr. Bull recommends "ploughing the land to the depth of nine inches, and the first year apply thirty or forty loads of compost to the acre, to promote the formation of roots. After that, twenty bushels of bone-dust, twenty of wood-ashes and five of gypsum are a sufficient dressing for an acre, for three years."

Planting.—The best time, in this State, is spring, just before the buds begin to push, except in very dry and warm soils. Here it is better to plant in the fall, as soon as the leaves drop;

then new roots shoot forth during warm days, and the vine makes a stronger growth in the ensuing year. Strong growing varieties, like Concord, Hartford Prolific and Diana, ought to be planted six feet apart in the rows, and the rows eight feet apart. The short-jointed varieties, like Delaware, six feet by six. Let the rows run north and south. The best plants, in my opinion, are well-rooted vines, one year old, raised from single eyes, and well supplied with fibrous roots. They are not so liable to be injured in taking them up; they will make nearly or quite as good a growth the first season, and will come into bearing as soon as older vines. In quantities, they cost much less. Mr. Bull prefers vines two years old, grown from cuttings in the open air. Either will make good vines. Dig a hole wide enough to allow the roots to spread out to their full length, and six or eight inches deep; then make a conical heap of soil in the centre of the hole, sloping from four inches from the level surface of the ground to the full depth of the hole; let the stem rest on the centre of this little mound, and spread out the roots in all directions, seeing that none of them touch each other. Then fill in with mellow earth, shaking the vine gently to settle the earth among the roots. Then fill up the hole and press the earth down gently with the foot. It is a good plan to water the vines well, after planting, if the soil is dry. Keep the vineyard free from grass and weeds, and the soil open and loose. Nothing should be allowed to grow in a vineyard except vines.

PRUNING AND TRAINING.—There are several modes of pruning; but the principle at the foundation of them all is, to cut off the excess of the last year's wood, so that they will not overbear, and yet leave enough to secure the healthy expansion of the vine. Grapes are always produced on the young shoots of the current year. When set to poles, by the spur system, take stout bean-poles, (spruce or cedar are best,) char the lower ends, or paint them with coal-tar, and set them at least eighteen inches deep, one to each vine, leaving six feet out of the ground. Young vines usually have three buds or eyes; when they have grown ten or twelve inches, tie up the strongest shoot to the pole, with bass-bark or straw, and pinch out the others at two leaves. Train the young shoot up perfectly straight, tying it to the pole every week. Laterals will grow from the axils of the leaves; and when they have made three leaves, pinch them off at two.

In the first year thrifty vines will grow from six to ten feet. If they run up weakly and slender, pinch off the end of the main shoot occasionally, to check the flow of the sap and make the vine stouter. The object is to get ripe and strong wood, no matter how long it takes; and, if possible, to get a brown, hard stem as high as the top of the stake at the end of the first year. In November, after the fall of the leaf, cut off all the laterals close to the main cane; and, if that is slender or unripe, cut that back to three buds, and grow a single cane again the next year. If the cane is strong and ripe, cut it off at the top of the pole. Cut off all green wood at the fall pruning, as it will winter-kill if you do not. In the winter, or late fall, cut the vines loose from the stakes and let them lie upon the ground, so that they can move with the wind and shake off rain and ice. In the spring, tie them up again, and rub out every other eye on the cane; or, in other words, leave buds enough to get shoots alternately, right and left, about nine inches apart, the lowest one fifteen to eighteen inches from the ground, the highest close to the top of the vine. These are spurs for the next year's crop. Keep them pinched in, so that they will not make over two feet each of ripe wood in the season, and cut off any fruit that may set, at once. Let the top shoot grow, without pinching, until September, when it may be broken off at the end. In November, of the second year, cut every other spur back to one bud, and the intervening ones to three buds; these will fruit the third year, and the single buds will make spurs for next year's bearing. In the month of November, of the third year, cut the spurs which have fruited back to a single bud, and prune the others to three buds, for next year's bearing. The vines are now established, and must be pruned in the same way during their life. Always let the top spur grow as long as it will; this will prevent the pushing of the next year's fruit-buds during the current season,—an accident which is liable to occur from close summer pruning. Do not overlop the vines while they are young, a practice which has injured many fine vineyards. When the grapes have set, go through the vineyard and cut out bravely one-half of the bunches, or even two-thirds, leaving only the largest and finest clusters. The crop will ripen earlier, weigh more, and be much finer, if treated in this way.

The renewal system, with horizontal arms, for training against fences and buildings and trellises. First year. Train the same as in the spur system. In November, cut back to eighteen inches, or to the point where you wish to take the arms. Second year. Let all the buds push, and train the two upper shoots to a pole, or to the trellis, pinching them occasionally to make them stout. Pinch all the other shoots, at two leaves, and keep them so. This will promote the growth of the main cane, by arresting some of the sap, and thus prevent the vine from getting hide-bound. At the fall pruning, cut back the two canes to three or four feet each, according to the strength of the vine; leaving the same length and the same number of buds to each. Then bend them down, one to the right and the other to the left, and tie them to the lower bar or wire of the trellis, so that the vine will be T shaped. Third year. Train up three or four shoots from each arm to the top of the trellis, at equal distances from each other. If some grow stronger than others, pinch in the strong ones till the weak overtake them. In other matters, treat the same as before. In November, cut back every other cane to one bud, and the intervening ones to three or four feet, for bearing the next year. Fourth year. In November, cut back the canes that have fruited to one bud, and the others to four feet. The spur system is the best for vineyards, and the renewal for houses and walls. In both systems, laterals must be pinched out at two leaves, and all suckers and shoots from dormant eyes on the old wood, must be rubbed off. Trellises can be made of cedar posts, set eight or ten feet apart, and telegraph-wire or wooden slats run across, twelve or fifteen inches apart.

Propagation.—Cuttings are the cheapest means of extending an established vineyard. At the November pruning, save cuttings of well-ripened wood, of the current year, twelve or fifteen inches long; bury them in dry soil, or in sand, during the winter, and, in the spring, plant two of them in the place where you want a vine. Set them about two inches apart. In the spring of the second year, pull, or dig up the weakest vine, and set vines, one year old, in the places where the cuttings failed to grow. The upper buds of the cuttings may be covered, one-third of an inch deep, after they are planted in a slanting position. If preferred, they can be set in nursery beds, and transplanted, when one or two years old. If grown from cuttings in the vineyard, the roots are never disturbed, and, in dry soil, or stony hill-sides, they strike down deeper, and make stronger plants. The earth should be mulched with cheap litter of some kind, and the soil kept loose around the young vines. Train them to a pole till they are strong enough to be pruned according to a system. Layers can be obtained by bending down shoots that grow near the ground, and covering them with three or four inches of earth. Put them down in July or August, and cut the cane half through near the parent vine. By November, they will be well rooted, and can be transplanted. The most rapid way of supplying the loss of an old vine is to take a long and strong shoot from the nearest vine, and layer it, in the place of the old one. It will bear the first year, and may be cut clear of its parent, in one or two years, according to its strength. The vines that produce the famous Burgundy wine of France, are renewed by layering every ten years. There are other modes of propagation, more expensive and difficult to manage. For those who desire to learn them, and, also, the principles of grape culture, I would recommend the "Grape Culturist," by Andrew S. Fuller, Brooklyn, New York, 1864, and "Grape Culture and Wine Making," by John Phin, New York, 1862. Either of these books can be ordered of any bookseller, at a moderate price.

Grafting.—Grafting is done in the fall, to the best advantage. Cut off the old stock squarely, six inches under ground; split it, for an inch or two, with a sharp knife; cut a scion long, wedge-shaped, with two buds, and fit the inner bark of the scion and stock together; tie with bass and fill the earth up to the level of the upper bud. Then invert a flower-pot over it, and bank up the earth, on the outside, to the level of the bottom of the pot; then cover that with six inches of straw, and bank earth over the whole. In this way the scion is protected from frost, and can be uncovered in spring, without disturbing its union with the stock. This is Fuller's method. The scion starts early in spring and makes a strong growth; frequently setting some fruit the first year. Grafts set in the spring often fail.

Varieties.—While there are some twenty or thirty varieties before the public, there are only three or four that have proved successful enough to warrant the recommendation of them for general vineyard culture, in this State. There are few grapes that combine the hardiness to resist our severe winters, the prolific fruitfulness to reward the cultivator, and the sweetness, richness, and high flavor which command the admiration of all lovers of good grapes. The Concord is a fine, large, black grape, with a beautiful blue bloom, and shouldered bunches often weighing a pound. Skin thin; flesh moderately juicy, buttery, and sweet. Flavor good; in my opinion, equal to the Isabella. It is the most hardy and strong-growing vine cultivated in this State. It is the most profitable grape to grow for the market; for the public taste demands something large, black, and handsome, as well as sweet. The Hartford Prolific, originated in the garden of Mr. Steele, in Hartford, Conn. It is smaller than the Concord, and about as good. It ripens a week or two earlier, but is apt to fall from the bunch as soon as ripe. Market-men will not buy it on that account. The Creveling originated in Pennsylvania. It is much like the Hartford, but does not fall from the bunches. None of these grapes have a spicy flavor or very delicate perfume; those qualities do not belong to the Vitis Labrusca, in an eminent degree. The Diana is a lilac-colored grape, having a thick skin and somewhat tough pulp, with a delicious juice and musky perfume. It is apt to rot in rainy weather. In this State, it ripens unevenly; part of the bunches remaining hard and green until frost cuts them off. It is a little too late for vineyard culture here, but will give satisfaction, if trained to the south side of a house or fence. The Delaware is a beautiful, amber grape, with a tinge of rose color. It is sweet, juicy, and melting, with a delicate flavor. The vine is hardy, and when fully established, prolific; though there are many vines which produce more wood and fruit. In quality, it is not surpassed by any native. The medium or small size of its fruit is its only fault. It requires a richer soil and more generous feeding than any other grape. When trained low and well ripened, it has made wine in all respects superior to Catawba, grown in the same locality the same year; both grapes being perfectly ripe. Grapes for the garden and south walls, to be grown only where they can have winter protection, are Allen's Hybrid, Rebecca, Union Village, Isabella, Diana; new ones, on trial, Adirondac, Iona, Israella, Rogers'

Hybrids, Framingham Seedling, Winchester. The Clinton is said to make good red wine, (claret,) but its growth is so rampant that it cannot be managed with profit in a vineyard.

Diseases.—Mildew and rot are apt to attack vines when hot weather succeeds that which is cold and moist. Sudden and extreme changes of temperature seem to be the exciting cause. Wet and clay soils are more subject to these diseases than such as are dry, sandy, and well drained. Mildew is a fungoid growth, which appears, first, on the under surface of the leaf, and rapidly creeps over it. It also attacks the berries, which then fail to ripen. The best remedy is sulphur, sprinkled on the leaves and earth among the vines. The rot attacks the berries in July; they turn black or red in spots, and fall off. No remedy has been discovered for it.

Final Advice.—Plant the Concord to sell as a market fruit. If you wish to raise only one variety, take that; for it will flourish in poorer soil than any other. If you desire several varieties, plant Creveling and Hartford Prolific in small proportion; though their ability to endure our hard winters has not been so well proved as that of the Concord and Delaware. If you wish to make wine, take a rich soil on the south or southwest side of a hill, and plant the Delaware. Excellent wine has also been made from the Concord. Late in the fall, cut the vines clear of the stakes and let them lie upon the ground, or cover them with earth. The increased certainty of a crop will pay for the expense.

BREAD.

ESSEX.

From the Report of the Committee.

From the specimens before us, we infer that there is a laudable ambition among the ladies of our county to excel in making bread; and this certainly is zeal in the right direction, for we consider poor bread one of the most unhealthy articles that can be put into the human stomach. We have seen bread on the table, hard, heavy, dark, waxy, and tough, colored green throughout with saleratus. We never see persons making a feed (it cannot be a meal,) on such indigestible stuff but visions of dyspepsia, nightmare, and work for the dentist come up before us; for it is now admitted by all that nothing destroys the enamel of teeth like saleratus taken into the stomach. Yet we have heard people who daily eat bread made green by saleratus, cursing the doctor, who, in a case of sickness years ago, gave them a dose of calomel, and destroyed their teeth.

We once heard a lady, who took pride in her cooking, assert that to have good bread it must rise till it was thoroughly sour, then add saleratus till it was sweet; that would make nice bread. It was suggested that it could be soured with cream of tartar. Ah! no; she knew better; she wanted the natural sour. We could never imagine why people who use cream of tartar to sour their dough, do not buy sour flour as a matter of economy; it can be bought less, and would save buying cream of tartar. We do not see why the same result could not be obtained. We wish every family in this country, (rebels included,) could have, daily, as good bread as the poorest specimen offered for our inspection, although we suppose some persons, who have been used to eating bread of the brickbat sort, would not relish decent bread, because the taste gets so depraved they could not recognize good bread when they eat it. This ought not to be so; for of all the various kinds of ailment to which civilized man has had recourse during our historical period, none have been so universally employed as bread.

Like most arts of primary importance, the invention of bread undoubtedly long preceded its history, which is involved in the usual obscurity of early times. The Greeks ascribe the introduction of agriculture to Ceres, and the invention of bread to Pan; but we know that the Chaldeans and Egyptians were acquainted with these arts at an earlier period. "And Abraham hastened into the tent to Sarah, and said, make ready quickly three measures of fine meal, knead it, and make cakes upon the hearth." There is reason to think, from some of the ancient writers, that the art of fermenting bread with yeast was known eighteen hundred years ago. Yet it was not common in Europe till within two hundred years. In 1688, the French government prohibited the use of yeast in making bread, under a severe penalty, in consequence of the representation of a college of physicians, who declared it to be injurious to health. But the superiority of yeast bread soon became apparent; the decisions of the medical faculty were forgotten; the laws were allowed to sink into oblivion, and the new mode of making bread soon found its way to other countries. The primitive mode of making bread is still preserved among the Arabs of the desert, who, as Niebuhr informs us, "lay cakes of dough in the coals, covering them with ashes till they are done, when they eat them warm." In the northern counties of England, in Scotland, and in Wales, unfermented bread is mostly used among the poorer classes. In Scotland it is baked in thin cakes, dried hard on racks, and kept for months. Not having been used to saleratus in their bread, the people there are able to operate on these cakes with their teeth, which the inhabitants of some localities we know would not be able to do.

Unfermented bread may be flakey, but it is never porous or spongy. As a general rule, it is not so wholesome, not being so digestible as fermented bread; but we believe, notwithstanding this, it would be better than the tough, clammy, sour, alkaline stuff which some people call fermented bread—and it is certainly time that every female, in our country at least, should know how to make good fermented bread; and we know no easier way to impart this knowledge and scatter it broadcast among the people, than for our society to offer premiums, require a statement, have them published; then those that run may read, and those that read may know how to make good bread. Then again, our society may become popular by these same exhibitions of bread.

Some of the loaves offered for our inspection were very beautiful, and were made by an unmarried lady. Before we had finished our examination a young gentleman praised the bread very much, and said he would certainly visit the lady before he went home. Now, if this visit should result in marriage, or if any exhibition of bread hereafter should have such results, and nothing can be more probable, we may feel that where a man gets a good wife, or *vice versa*, they would be decided friends of the society.

EDMUND SMITH, *Chairman*.

MIDDLESEX.

From the Report of the Committee.

The grains which we use for bread consist mostly of starch, gluten and sugar. The object of forming them into bread, is to effect such a change in them as shall render them palatable and more easily digested. The grain is first pulverized and then sifted, to separate the different qualities of the meal. The external, or woody portion of the grain, is the bran. The inner part is the flour. The gluten is tougher and more difficult to grind. The finest and whitest portion, obtained by repeated sifting, consists of a larger proportion of starch. The darker colored part is richer in gluten, and as the nutritive properties are in proportion to the gluten, this portion makes the most nutritious bread.

When flour is mixed with water, kneaded into dough and baked, it will be tough and clammy. If spread out into a thin sheet, it will be hard and horny. In neither case will it be palatable or easily digested. To avoid these results, and to form a light, spongy dough, different methods are adopted. If a paste of flour and water be permitted to stand some days in a warm place, it commences to putrify, and grows sour. If a small portion of this be incorporated into fresh dough, the decomposing gluten acts upon the sugar of the flour, and excites what is called the vinous fermentation, changing the sugar into alcohol and carbonic acid.

The carbonic acid is set free in the form of minute bubbles of gas throughout the whole substance of the dough, and being retained by the adhesive gluten, it causes the whole mass to swell or rise. These bubbles form the pores or small cavities which, in well-made bread, are small and uniform, but if the dough is too watery, or not well kneaded, or if the flour is too fine, are sometimes large, irregular cavities or holes in the bread. If the fermentation is carried too far, the vinous fermentation passes into the acetous fermentation, and the alcohol is changed into vinegar, and the dough becomes sour.

This may be corrected by the addition of carbonate of soda or magnesia, which neutralizes the acid, forming an acetate of soda or magnesia, which gives no disagreeable taste, and acts as a gentle laxative, and is wholly unobjectionable. By fermentation the bread is made light at the expense of the sugar in the flour, which, as has been said, is changed into alcohol and carbonic acid, both of which are expelled by the process of baking. Any method by which a gas is set free throughout the whole mass, answers the purpose.

If carbonate of soda is mixed with the flour, and muriatic acid, largely diluted, be added, the acid and soda unite, forming common salt, and the carbonic acid previously combined with the soda, is set free, rapidly forming a very light sponge. This must be kneaded immediately, and forms a very palatable bread, containing nothing injurious. Carbonate of ammonia is often used in making cake. The carbonic acid and the ammonia are both driven off in the process of baking.

The heat, in baking, causes the gluten and starch to form a chemical compound which cannot be separated by washing with water, as could be done when they were in the state of flour; in consequence of this change, and of its light, spongy form, bread becomes easily soluble in the stomach. The water added to the flour, forms about a third of the weight of the bread. That which is not evaporated becomes converted into a solid, and forms a chemical union with the bread.

Having thus spoken of the general principles of bread-making, we will close with a few remarks upon the bread which came under our notice.

The examination of a large number of loaves on exhibition, satisfied your committee that genius achieves success in its own way. There were scarcely two specimens made in precisely the same way, and scarcely two that had precisely the same taste, and yet nearly every sample could be pronounced good bread; indeed, we suppose that every loaf was considered superior by its maker, or it would not have been presented for a premium.

It is truly surprising that so high a standard of excellence should have been reached, when we consider the difference in the quality of the flour and meal, the difference in the quality and quantity of the yeast, the difference in the quality and quantity of the milk, and even in the quantity and quality of the water used in the mixing; for we believe the quality of the water may sensibly affect the character of the bread; the difference in the amount of the sugar, molasses, salt, and other ingredients used; the difference in the degrees of heat to which it was subjected, and the difference in the time occupied by baking.

With all these differences, so much good judgment was employed, that the end aimed at, good bread, was in nearly every instance attained. The principal defects noticed by the committee, (and here the experience and nice discernment of the lady members were brought into requisition,) were the use of too much yeast, and in one or two instances, the use of too strong an infusion of hops in making the yeast, too much salt, baking the bread too quickly, or in an oven too hot, by which the surface was overdone while the interior was slack baked.

In one or more loaves mixed chiefly with milk, the dough was left in a warm place to rise, and the milk became changed before the loaf was sufficiently light, giving to the bread the smell and taste of sour milk. This was the case with one loaf which presented to the eye a very beautiful appearance. Milk more than twelve hours old should not be used in mixing bread, unless soda or magnesia is used with it; new milk is decidedly better. *But the most common defect was the want of sufficient working or kneading of the dough.* In the best samples, *the dough was subjected to a thorough working*, both before and after rising.

J. Reynolds, *Chairman.*

DISTRIBUTION OF NEAT CATTLE IN THE UNITED STATES.

WORCESTER SOUTH-EAST.

From the remarks of the Secretary.

The Census Reports for 1840, 1850, and 1860, furnish the data from whence certain "facts" have been eliminated. The first great law established is, that the ratio between the number of the people and the number of the neat cattle must always be the same, whether the population be ten millions or twenty millions. This will be seen, when we consider that neat cattle are kept principally to supply the demand for beef, butter, cheese and milk. These articles being consumed wholly by the people, the demand becomes a *constant* quantity, and therefore, if supplied, the ratio must be *constant*. By the census of 1840, it was found that there were 87 neat cattle for every 100 inhabitants; by the census of 1850 there were 79 neat cattle for every 100 inhabitants; and by the census of 1860, there were 81 neat cattle for every 100 inhabitants. Assuming that there should be 80 neat cattle for every 100 inhabitants, as being a near approximation to the truth, from the same statistics we learn that of these there must be 8 working oxen, 28 milch cows, and 44 other cattle. But without the discovery of *another law* these facts would be of small practical benefit; we should not know where the demand for neat cattle existed, or from whence the demand could be supplied.

The deficiencies or excesses only generally and vaguely known to exist somewhere, led to no practical solution of the difficulty. It was agreed that Massachusetts, to supply the demand for home consumption, had to purchase and transport for long distances, from beyond her borders, large quantities of beef, butter and cheese; but just how much it required to satisfy the demands of her people, beyond home production, or from where the constant diminution of home supply was to be complemented in future, were problems which remained to be solved. The census of 1840, showed that Massachusetts had 38 neat cattle to every 100 inhabitants; that of 1850, that she had 26; and that of 1860, that the number had diminished to 22, for every 100 inhabitants, instead of 80, which would be the number just sufficient for home consumption.

The other great law established is, *that cattle are moved to the eastward and capital to the westward*, to supply the increasing demands of the deficient sections.

The distribution of cattle in the United States, in 1840, divided into three classes, was as follows, viz.:—in that section of the United States east of Chesapeake Bay, the Potomac River, and the western boundary of Pennsylvania, there were less than 80 neat cattle to every 100 inhabitants. This may be called the *minimum* district.

In the district composed of the States of Ohio, North Carolina, Virginia, Michigan, Iowa, Indiana, South Carolina, Wisconsin, and New Hampshire, there are from 80 to 100 neat cattle to every hundred inhabitants. This may be called the *medium* district.

In the district including the remaining States there are more than 100 cattle to every 100 inhabitants. This may be called the *maximum* district.

The general law of distribution is thus plainly shown, in 1840. Beginning on the eastern limit, cattle are found in small numbers and go on constantly increasing, until we find the West has *three* times as many cattle as the East, the smallest ratio being in Rhode Island and Massachusetts, and the largest, nearly six times as great, being in Florida and Arkansas.

During the next decade, ending in 1850, we find the boundaries of our three classes much changed. The western limit of the *minimum* class has moved far westward. Instead of the terminus of the Potomac and the Monongahela, its western boundary has been carried forward, so as to include North Carolina, Virginia, Ohio, Michigan, Wisconsin, Iowa, Minnesota, Indiana, Kentucky, and Tennessee. In ten years the line of minimum production has made a westward advance of at least 500 miles.

Alabama and New Hampshire now alone constitute the *medium* class.

The *maximum* class, with the loss of Alabama, occupy the same area as in 1840, but those States east of the Mississippi have depreciated from an average of 145 per cent. in 1840, to 115 per cent. in 1850; while those west of that river have increased their ratio from 131 per cent. in 1840, to 159 per cent. in 1850. Texas stands at the head of the list, having 438 cattle to every 100 of its inhabitants.

During the decade, ending in 1860, the *minimum* class remains nearly the same. South Carolina, which had risen to the maximum class in 1850, is included in this class, while Indiana has risen to the *medium* class, furnishing 87 per cent.

The *medium* class now contains many States which in 1850, were allocated with the *maximum* class. Alabama, Georgia, Illinois, Indiana, Kansas, Mississippi, Missouri, and New Hampshire, now contain from 80 to 100 per cent. During this decade, of all these States, Indiana alone has made an increase, rising from 72 to 87 per cent.

The *maximum* class now numbers but two States east of the Mississippi—Florida and Vermont. The States of Texas, Oregon, California, Arkansas, and Kansas, Washington, Nebraska, and the other territories now compose this class.

Thus we see the supply of cattle in the South-West is much larger than in the middle or eastern portion of the country; and although the southern States are better supplied than the northern, still their future and main reliance must be on Texas. This accounts for the tenacity with which the rebels have held on to that State. From the facts above stated, the *two general laws*, are, we think, plainly shown.

1. That, taking all the States into the account, every 100 inhabitants require 80 neat cattle; of which 8 must be working oxen, 28 milch cows, and 44 other cattle. The fact that this ratio has not varied *one per cent.* for 30 *years*, settles the fact of its very close approximation to the truth.

2. That cattle are moving *eastward*, and capital *westward*. But all general laws of this kind are subject to modifications by disturbing forces. In the present instance the cattle on the Pacific slope, as well as most of the cattle in Texas, should be excluded, in considering the question of demand and supply of individual States, for the reasons that the cattle west of the Rocky Mountains are isolated from the United States proper, and most of those in Texas are not sufficiently domesticated to be driven east in any great numbers. In discussing the ques-

tion of demand and supply, or the movement of neat cattle, Texas, and the section west of the Rocky Mountains, should be omitted.

This done, we find the ratio between neat cattle and the population as 68 to 100 ; that is, there will be 68 cattle, to every 100 inhabitants. All those States, therefore, which have more than 68 cattle to every 100 inhabitants, have a surplus for export, while those having less than 68, have a deficiency to be provided for.

The following tables are computed on the basis of 68 per cent. for local use, and will show where the excesses and deficiencies exist, and whence the movement of cattle must be to satisfy the demand.

TABLE I.

Showing the number of cattle to each one hundred people in those States where there was an excess over the requisite number, sixty-eight, required for home consumption and use, in the years 1840, 1850 *and* 1860; *also the total number for exportation in each State.*

STATES.	Number of cattle more than required for home use.			Total No. of cattle for exportation in 1860.
	1840.	**1850.**	**1860.**	
Florida,	149	231	206	289,275
Arkansas,	126	71	58	252,561
Vermont,	67	44	47	148,096
Nebraska,	–	–	32	9,228
Utah,	–	43	32	12,887
Missouri,	45	48	30	354,603
Georgia,	59	53	27	285,467
Mississippi,	98	53	22	174,087
Indiana,	22	4	19	256,581
Illinois,	72	39	19	325,270
Alabama,	45	26	13	125,346
New Hampshire,	29	16	13	42,389
Kansas,	–	–	13	13,936
Iowa,	20	3	11	74,234
Louisiana,	40	43	5	35,400
Kentucky,	33	9	4	46,227
South Carolina,	28	48	4	28,148
Michigan,	19	1	3	22,473
Ohio,	12	1	2	46,790
North Carolina,	14	12	1	9,926
Total excess,	–	–	–	2,552,934

Table II.

Showing the number of cattle on hand and the deficiencies to each one hundred people in the several States, and also the total deficiency in each of the several States, in 1860.

STATES.	No. of cattle on hand.	Additional No. required.	Total deficiency.
Minnesota, ...	68	–	–
Tennessee, ...	68	–	–
Wisconsin, ...	66	2	15,517
Virginia, ...	65	3	47,889
Maine, ...	59	9	56,545
Delaware, ...	51	17	19,676
New York, ...	50	18	698,032
Connecticut, ...	48	20	92,029
Pennsylvania, ...	48	20	581,223
Dakotah, ...	38	30	772
Maryland, ...	37	31	212,985
New Jersey, ...	24	44	265,695
Rhode Island, ...	22	46	80,325
Massachusetts, ...	22	46	566,262
District of Columbia, ...	1	67	50,303
Total deficiency, ...	–	–	2,687,153

From these tables it will be seen, that, in New England, there is a deficiency, falling short of the use and consumption of its inhabitants, of 594,676 neat cattle, to be furnished from other quarters. In Massachusetts, 566,362 ; being *more than in one-fifth* of the total deficiency. In the Middle States, there is a deficiency of 1,564,526 ; in Maryland, 212,985, and which, added to the deficiency in New England, gives a total net deficit of 2,372,187 neat cattle in the States east of Ohio.

From the *two great facts*—1st, that the number of neat cattle, required for every 100 of the population, has not varied a single per cent. for the last thirty years ; and 2d—that the movement of cattle has constantly been *westward*, and that the deficit, east of Ohio, has been as constantly increasing, it is plainly to be seen that Massachusetts, with a deficit of over half a million, has a deep and vital interest in the practical questions involved in these astounding revelations.

In peace as in war, the farther we are from our base of supplies the more they will cost. As the supply of neat cattle travels westward, the cost will be increased by the increased charges of transportation and the extra profits paid to middle men. The prime cost, for some years to come, at least, will also be largely increased by the short supply consequent upon the ravages of war, and the interruption of agricultural operations in the rebel States. At the opening of the rebellion the southwestern States were overstocked, but, at the present time, we cannot doubt that those States now fall far below the average number required for every 100 of its inhabitants, and, consequently, were there no interruption to transportation, would have none to export. For years to come, beef, butter, cheese and milk will command high prices, and especially in those sections where there is the greatest deficiency of these products.

What will the farmers of Massachusetts do? They must make up their minds to do one of two things. Either to sit down under the high prices that will rule for an indefinite period, or, by increasing their stock, enter into competition with the western stock raiser for the *home market*. No one, we think, can doubt that, while our State lacks 46 neat cattle to supply the wants of every 100 of her inhabitants, it can be otherwise than profitable to enter into the business of cattle raising. It will be a long time, we fear, before beef and the products of the dairy will come down to the quotations of the prices current of three years ago.

There is breadth enough of unclaimed swamps and abused pasture in Massachusetts, we believe, to support, and without detriment to its broad acres of tillage and grass land, all the cattle necessary to supply the wants of all its inhabitants. To accomplish this desirable, and, without any manner of doubt, *profitable* result, there must be more labor and more manure. With the great and increasing influx of a vigorous and hardy immigration, the farmer can supply himself with all the labor he needs, and by renewed and intelligent husbandry, increase the quantity and quality of his fertilizers to the full measure of his wants.

We have little doubt that the discovery and verification of the two laws governing the "distribution and movement of cattle in the United States," will lead to a greatly improved condition of agriculture, especially in New England.

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